US009307129B2

(12) **United States Patent**
Oh et al.

(10) **Patent No.: US 9,307,129 B2**
(45) **Date of Patent: Apr. 5, 2016**

(54) **TERMINAL CASE, MOBILE TERMINAL, AND MOBILE TERMINAL ASSEMBLY INCLUDING THE TERMINAL CASE AND THE MOBILE TERMINAL**

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(72) Inventors: **Jungin Oh**, Seoul (KR); **Sanghyun Eim**, Seoul (KR); **Daiki Min**, Seoul (KR); **Julie Park**, Seoul (KR); **Myungsoo Choi**, Seoul (KR); **Jisun Yang**, Seoul (KR)

(73) Assignee: **LG Electronics Inc.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/271,085**

(22) Filed: **May 6, 2014**

(65) **Prior Publication Data**

US 2014/0333831 A1 Nov. 13, 2014

(30) **Foreign Application Priority Data**

May 7, 2013 (KR) 10-2013-0051523
Jun. 5, 2013 (KR) 10-2013-0064710

(51) **Int. Cl.**
H04N 5/225 (2006.01)
H04M 1/00 (2006.01)
G06F 1/16 (2006.01)
H04M 1/02 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04N 5/2254*** (2013.01); ***G06F 1/16*** (2013.01); ***H04M 1/0245*** (2013.01); ***H04M 1/185*** (2013.01); ***H04M 1/67*** (2013.01); *H04M 2250/52* (2013.01)

(58) **Field of Classification Search**
CPC G06F 1/1637; G06F 3/041; G06F 3/0202; G06F 3/03547; G06F 2203/04809; G06F 3/044; G06F 2203/04103; G06F 1/1643; G02B 27/027; G02B 27/025; H04M 1/22; H05K 3/067
See application file for complete search history.

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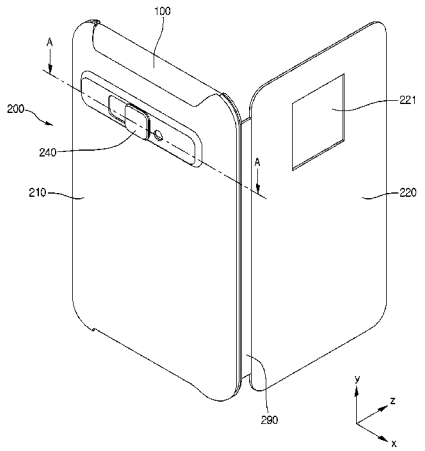
Primary Examiner — Sinh Tran
Assistant Examiner — Selam Gebriel
(74) *Attorney, Agent, or Firm* — Dentons US LLP

(57) **ABSTRACT**

A mobile terminal assembly is provided. The mobile terminal assembly includes: a terminal case; and a mobile terminal detachable from the terminal case, wherein the terminal case comprises: a case body; and a lens cover openably disposed in the case body, wherein the mobile terminal comprises: a display unit; a camera module including a camera lens disposed at a position corresponding to the lens cover; a lens cover sensing unit sensing whether the lens cover is opened or closed; and a control unit configured to execute a camera application on the basis of whether the lens cover is opened or closed.

15 Claims, 43 Drawing Sheets



(51) **Int. Cl.**
H04M 1/67 (2006.01)
H04M 1/18 (2006.01)

(56) **References Cited**

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* cited by examiner

FIG. 1

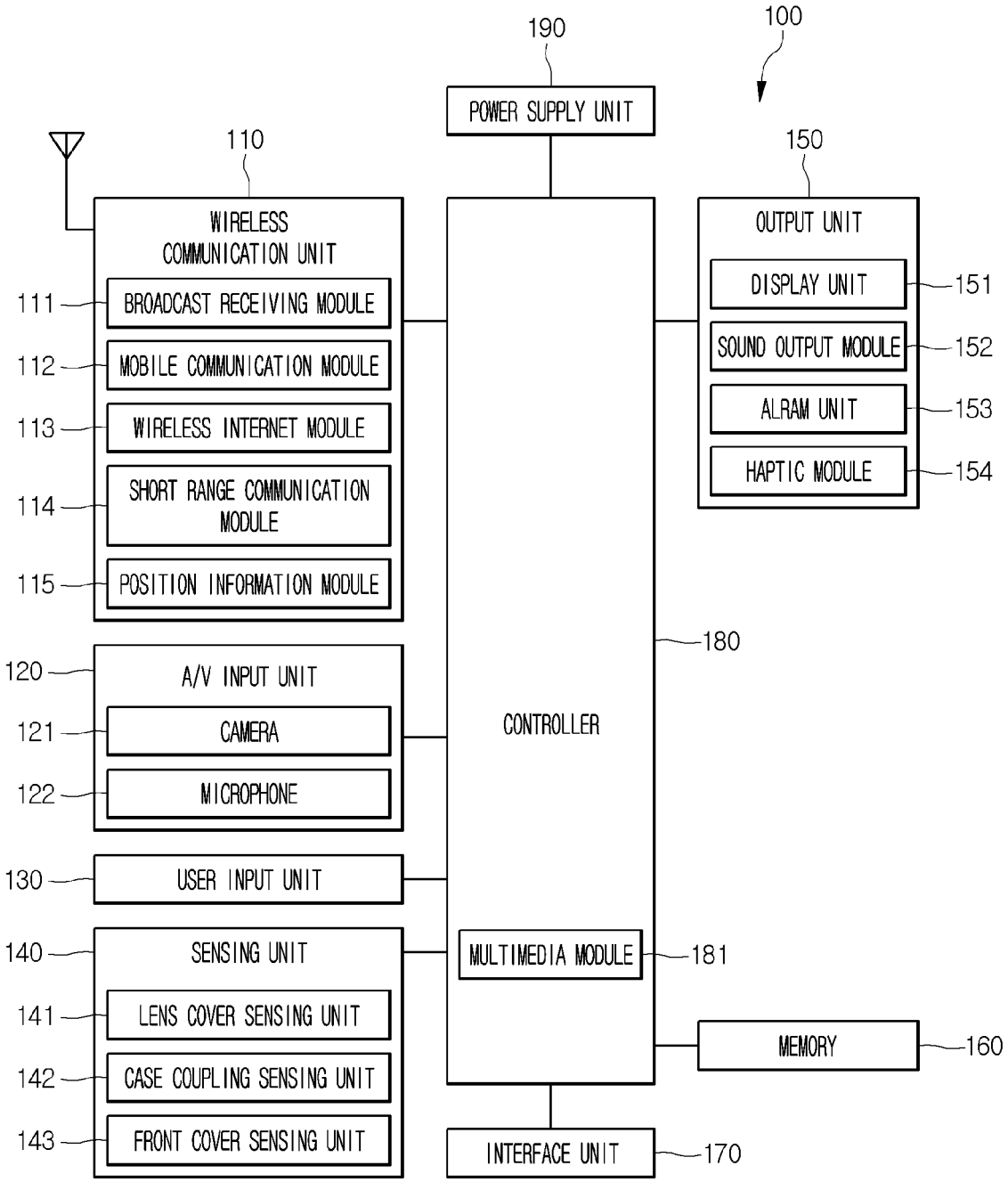

190
100
POWER SUPPLY UNIT
110
150
WIRELESS COMMUNICATION UNIT
OUTPUT UNIT
111
BROADCAST RECEIVING MODULE
DISPLAY UNIT
151
112
MOBILE COMMUNICATION MODULE
SOUND OUTPUT MODULE
152
113
WIRELESS INTERNET MODULE
ALRAM UNIT
153
114
SHORT RANGE COMMUNICATION MODULE
HAPTIC MODULE
154
115
POSITION INFORMATION MODULE
180
120
A/V INPUT UNIT
121
CAMERA
CONTROLLER
122
MICROPHONE
130
USER INPUT UNIT
140
SENSING UNIT
MULTIMEDIA MODULE
181
141
LENS COVER SENSING UNIT
MEMORY
160
142
CASE COUPLING SENSING UNIT
143
FRONT COVER SENSING UNIT
INTERFACE UNIT
170

FIG. 2

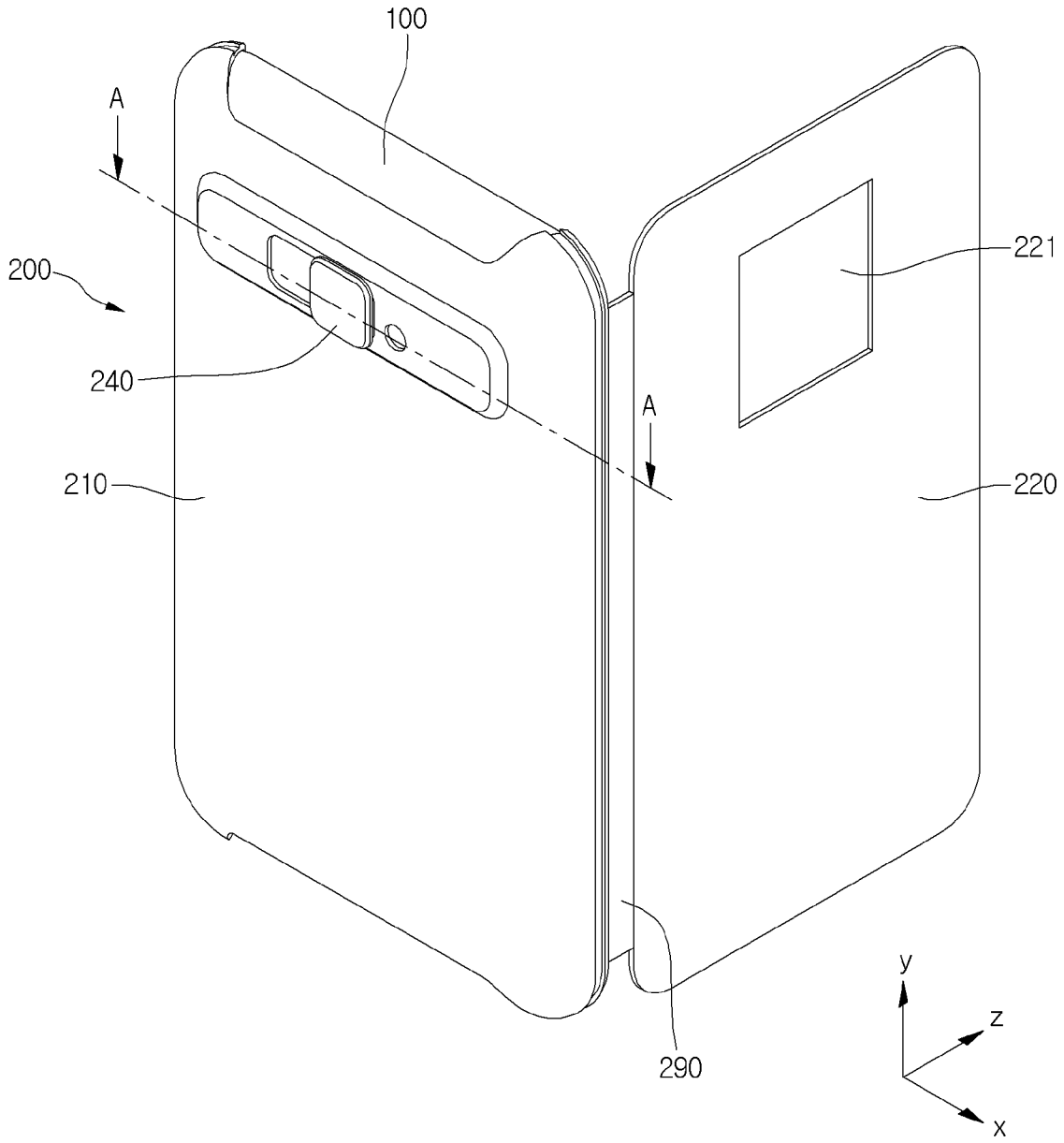


FIG. 3

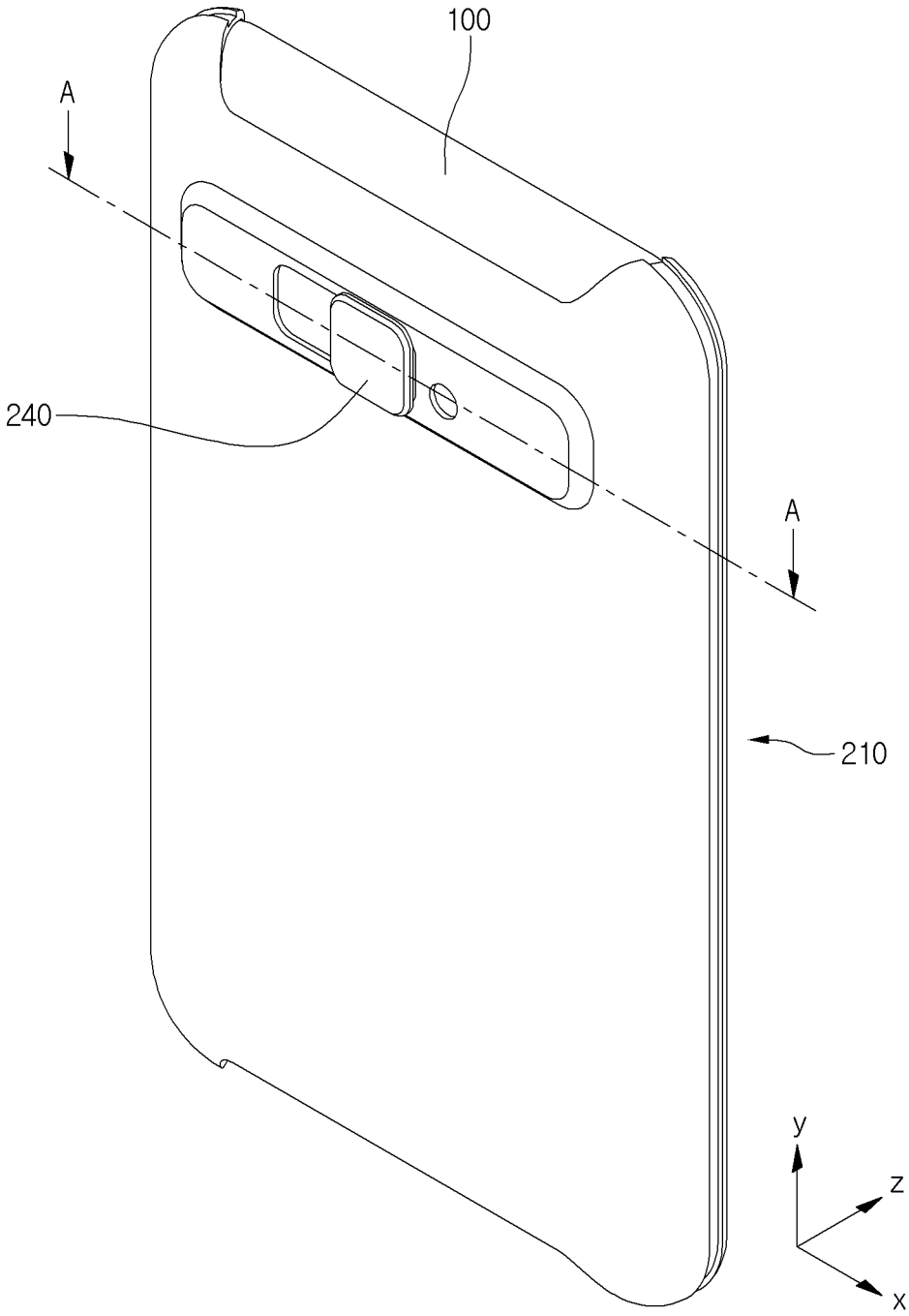


FIG. 4

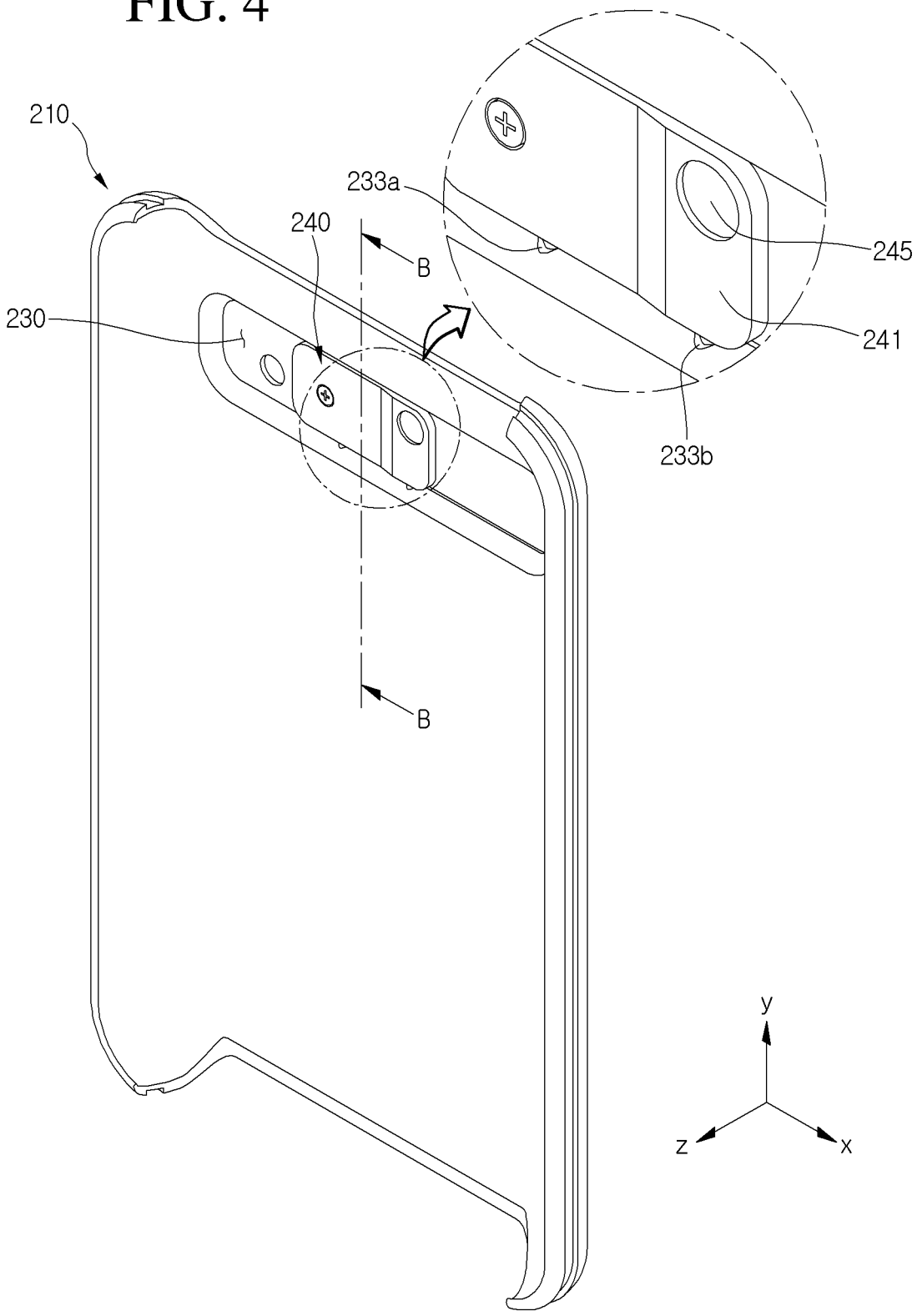


FIG. 5

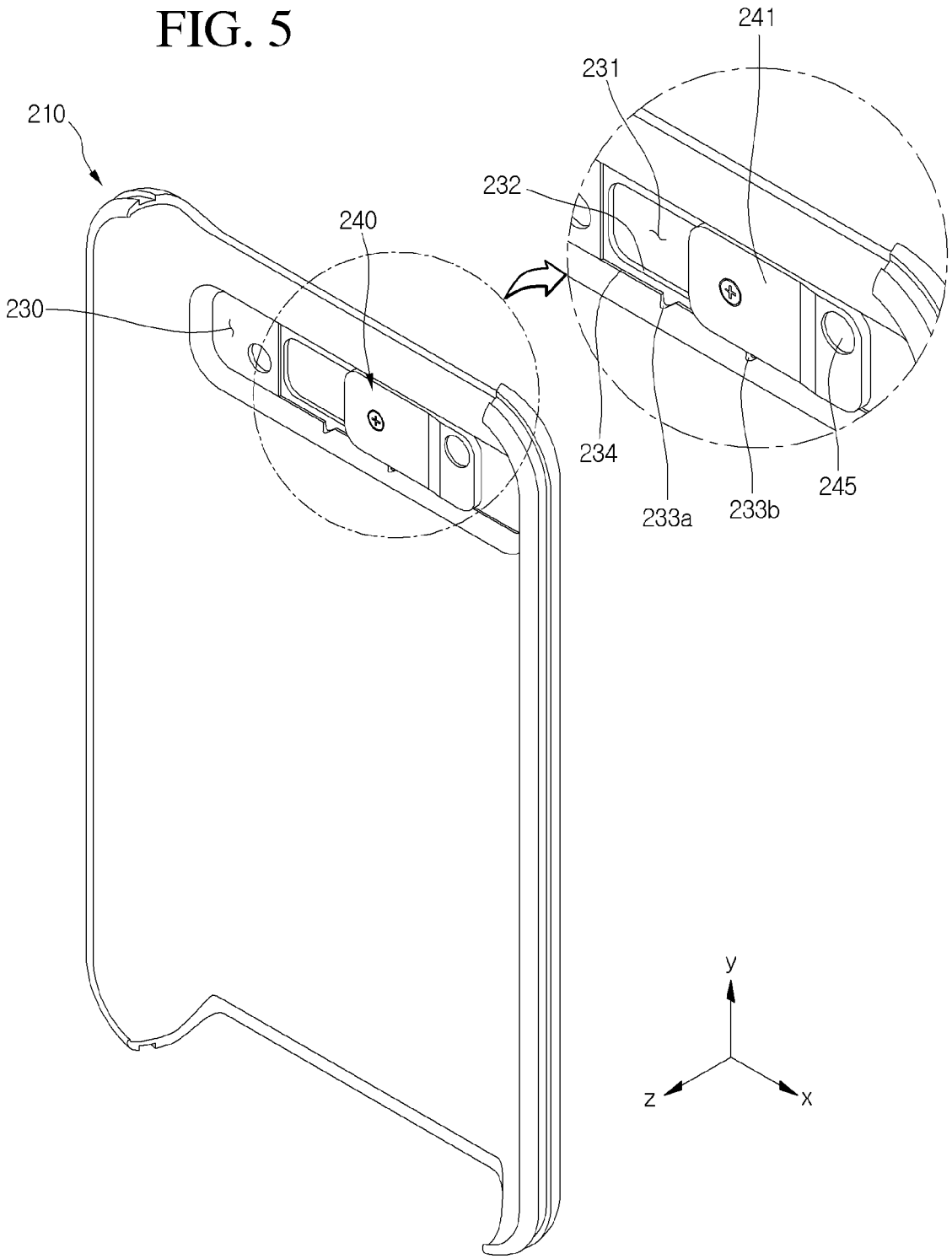


FIG. 6

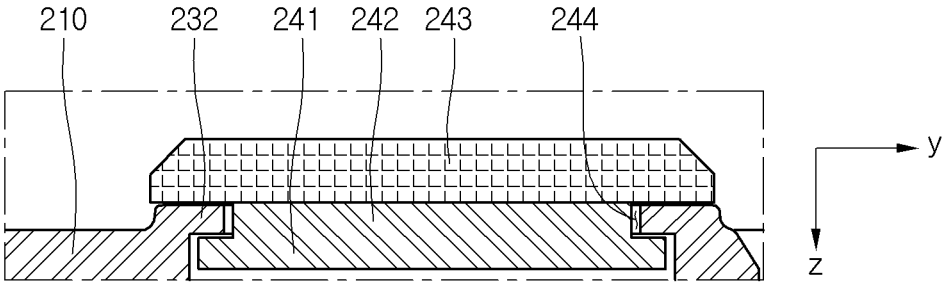


FIG. 7

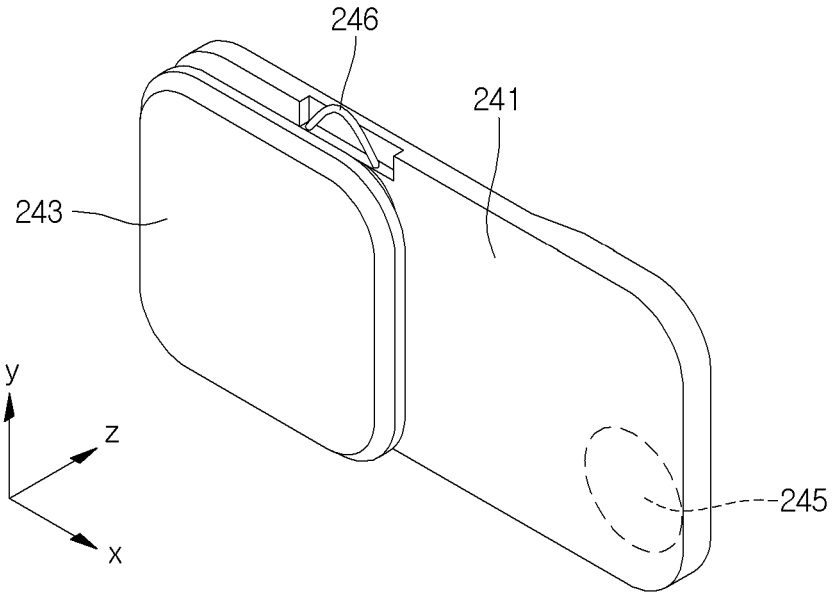


FIG. 8

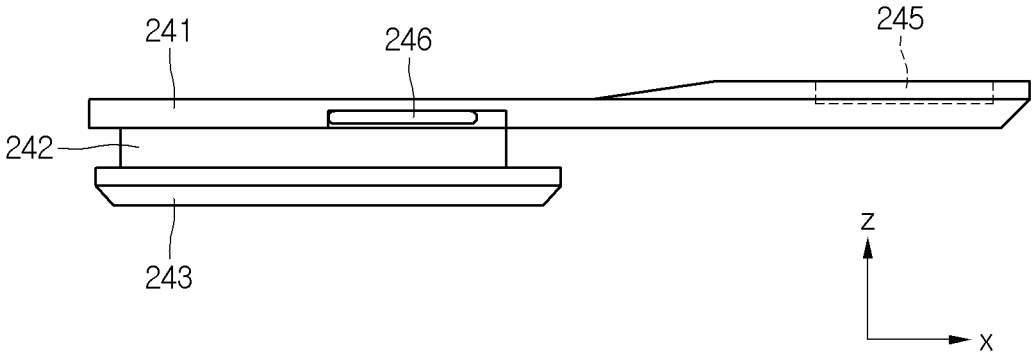
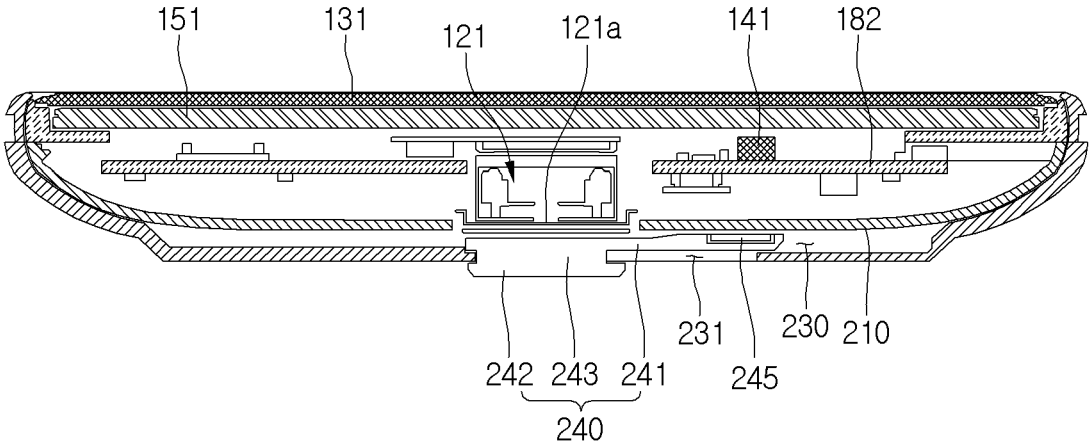


FIG. 9



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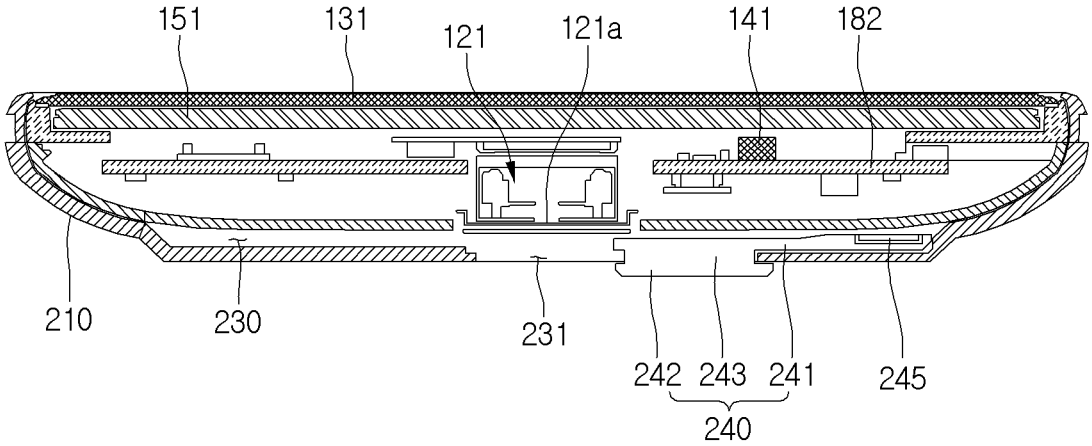


FIG. 11

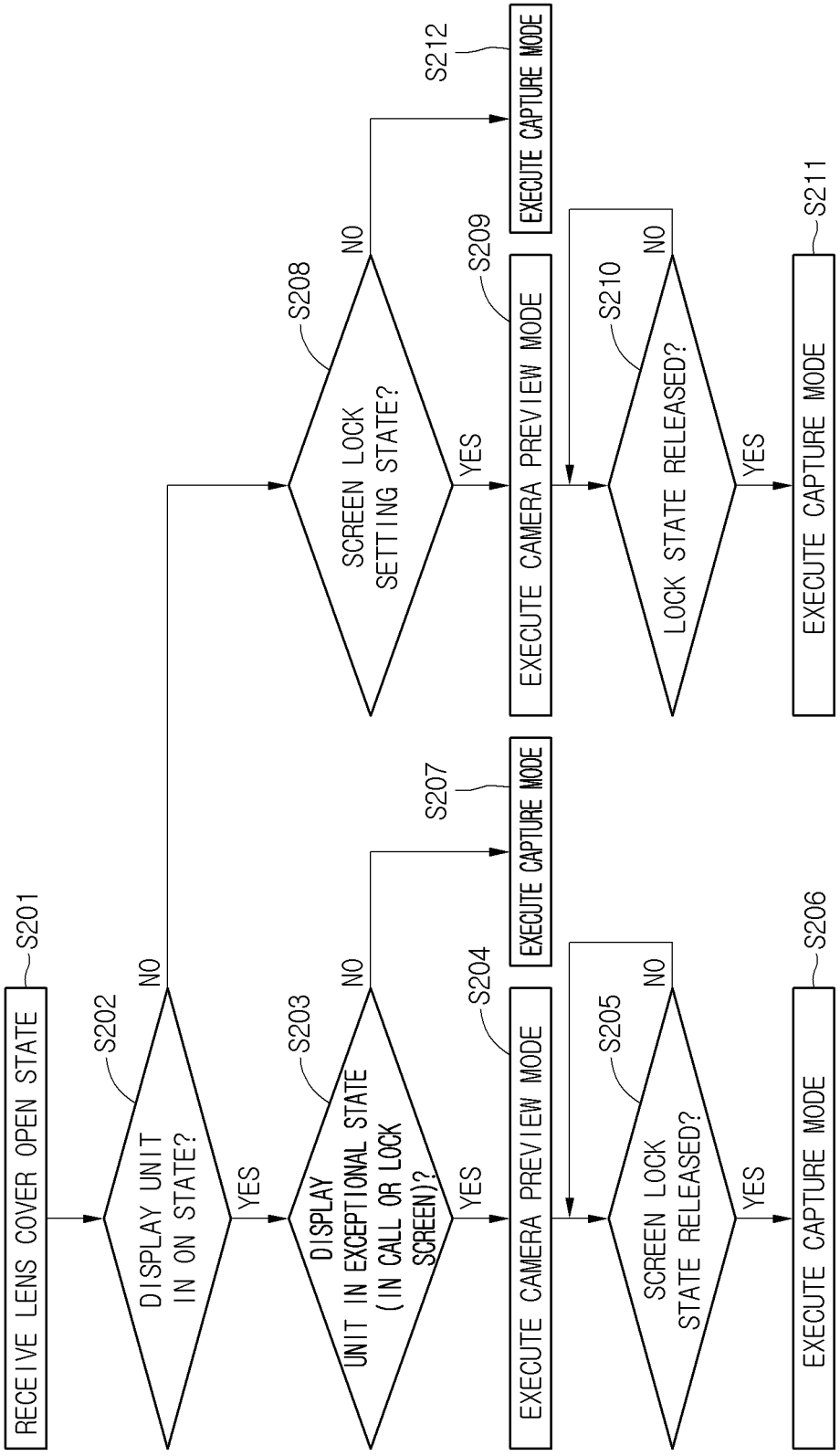

RECEIVE LENS COVER OPEN STATE
S201
DISPLAY UNIT IN ON STATE?
S202
NO
YES
DISPLAY UNIT IN EXCEPTIONAL STATE (IN CALL OR LOCK SCREEN)?
S203
NO
YES
EXECUTE CAMERA PREVIEW MODE
S204
SCREEN LOCK STATE RELEASED?
S205
NO
YES
EXECUTE CAPTURE MODE
S206
EXECUTE CAPTURE MODE
S207
SCREEN LOCK SETTING STATE?
S208
NO
YES
EXECUTE CAMERA PREVIEW MODE
S209
LOCK STATE RELEASED?
S210
NO
YES
EXECUTE CAPTURE MODE
S211
EXECUTE CAPTURE MODE
S212

FIG. 12

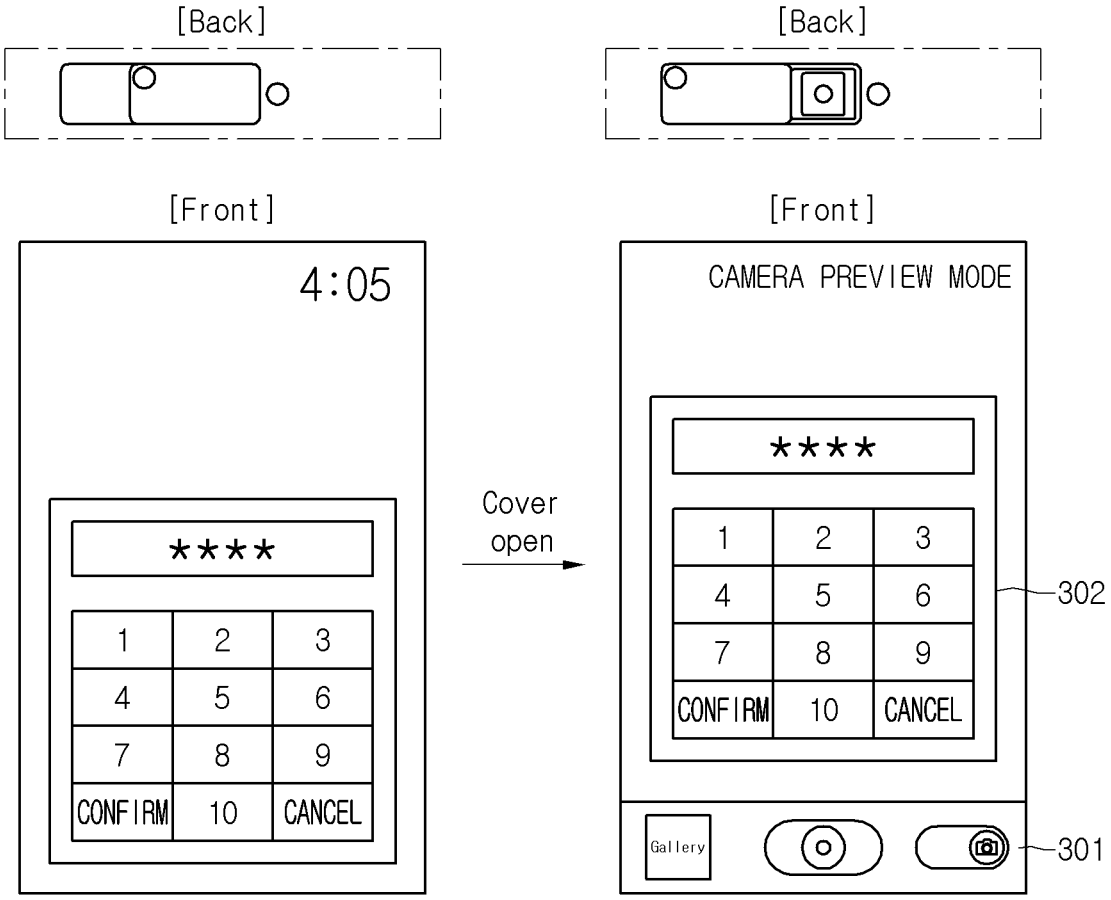
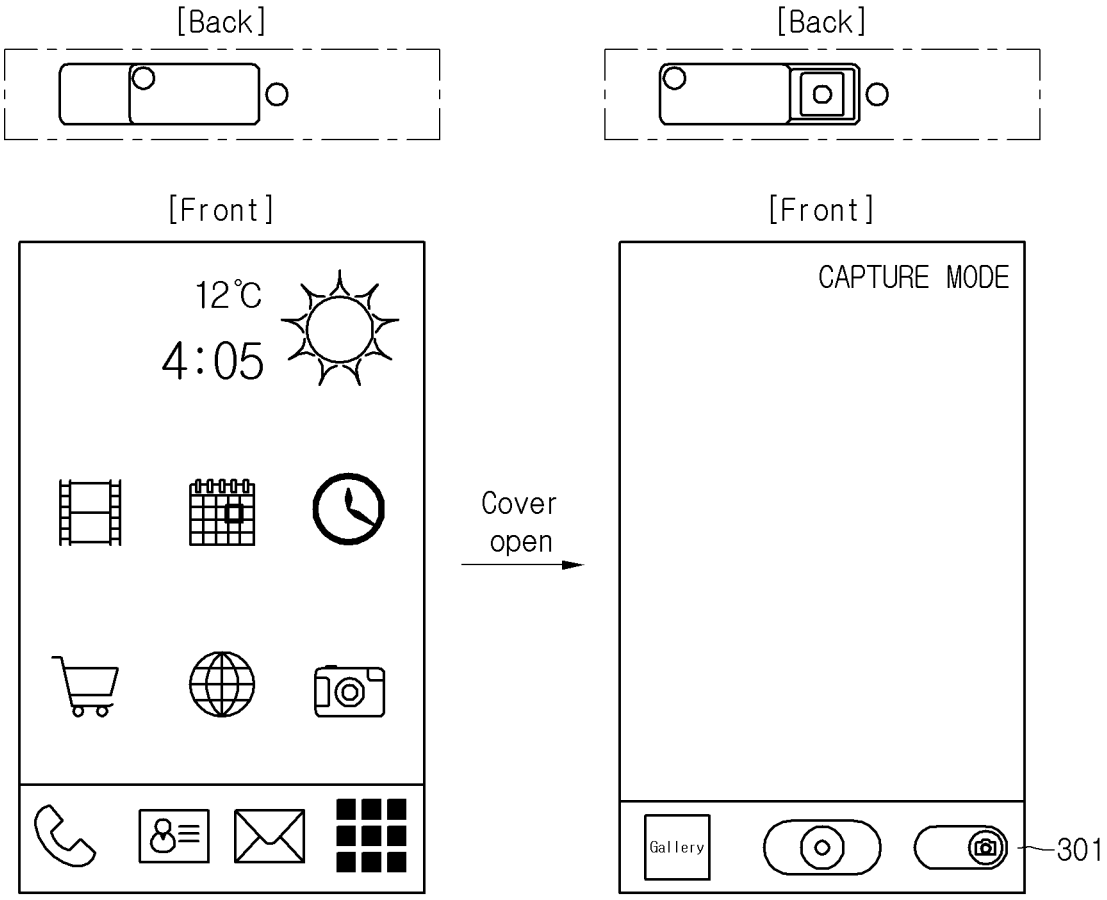

[Back]
[Back]
[Front]
[Front]
4:05
****
1 2 3
4 5 6
7 8 9
CONFIRM 10 CANCEL
Cover open
CAMERA PREVIEW MODE
****
1 2 3
4 5 6
7 8 9
CONFIRM 10 CANCEL
302
Gallery
301

FIG. 13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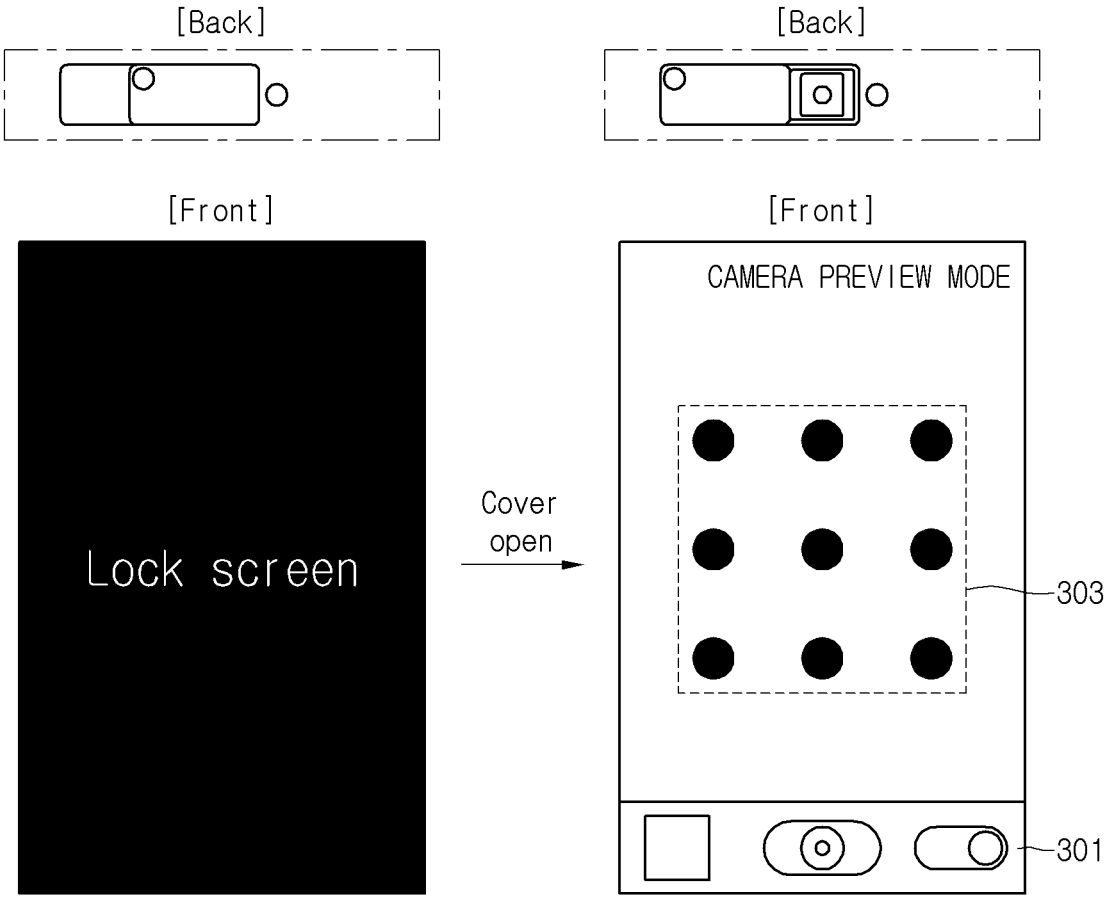
12℃
4:05
Cover
open
CAPTURE MODE
Gallery
301

FIG. 14


[Back]
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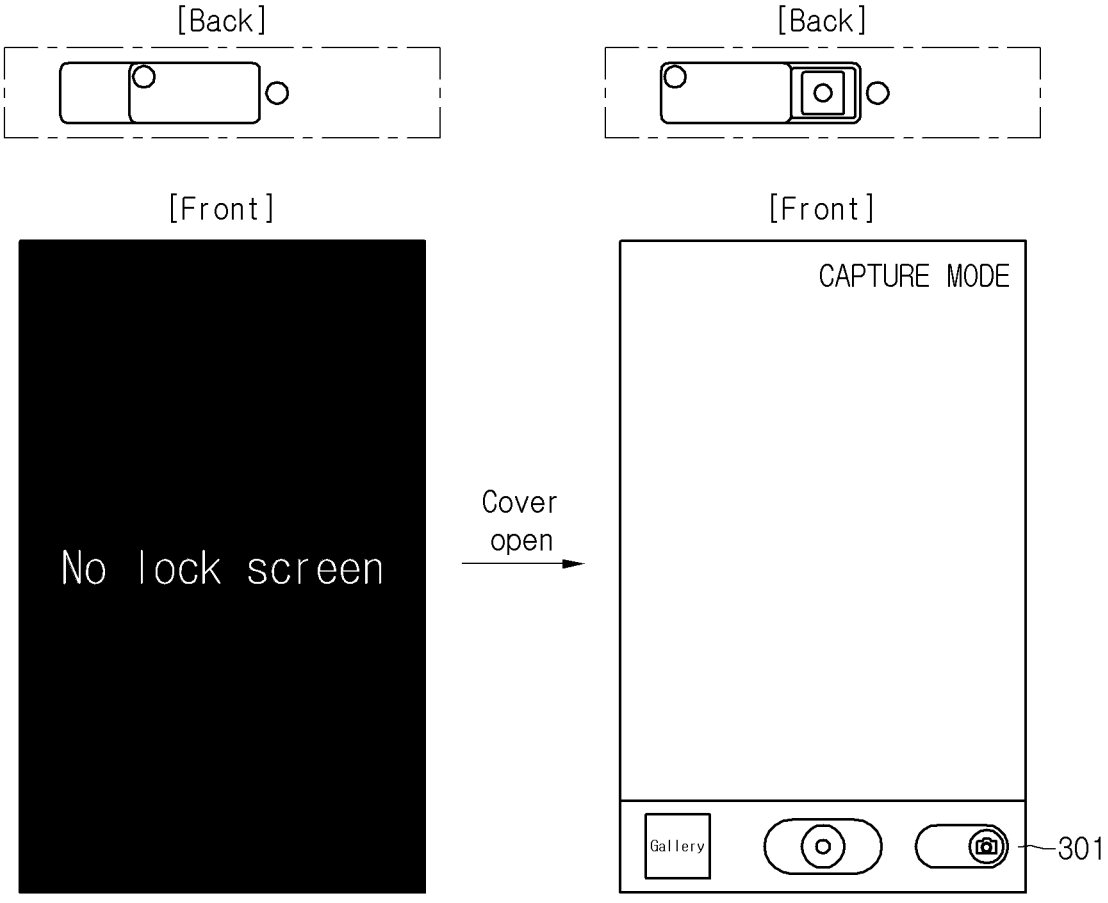
[Front]
CAMERA PREVIEW MODE
Lock screen
Cover
open
303
301

FIG. 15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No lock screen
Cover open
CAPTURE MODE
Gallery
301

FIG. 16

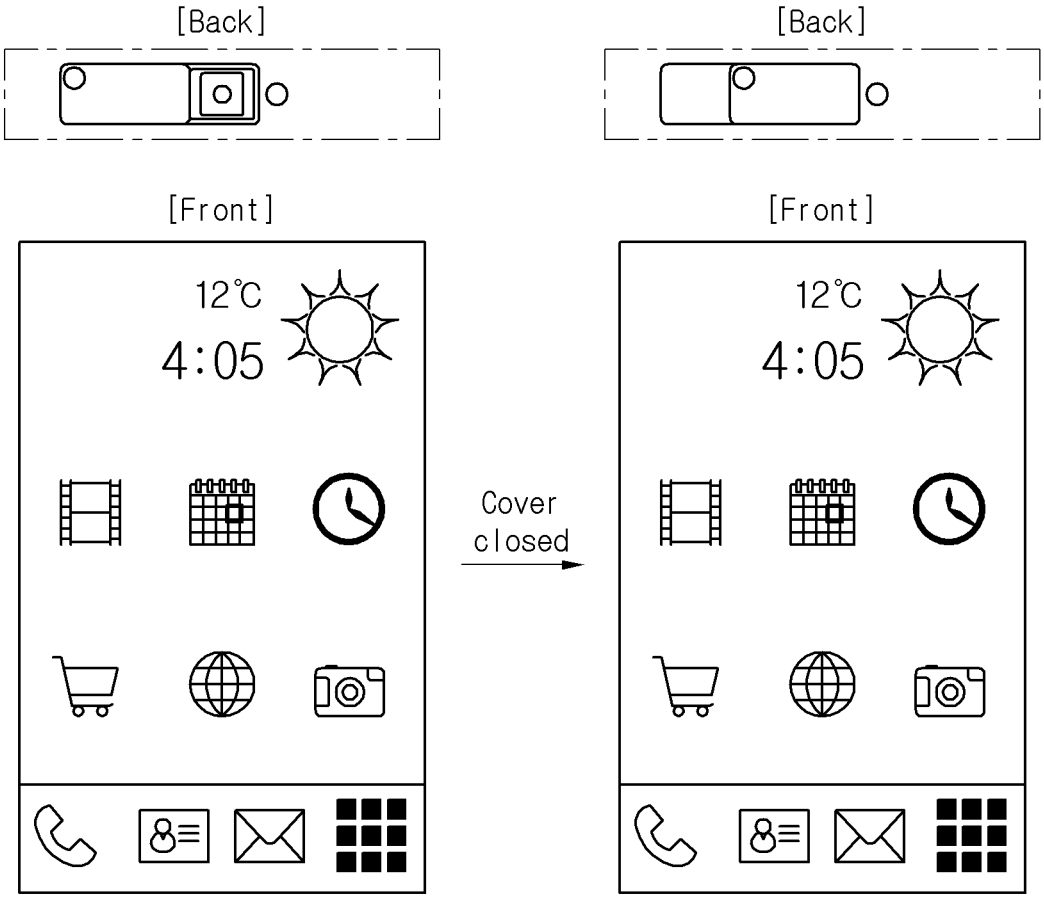


FIG. 17

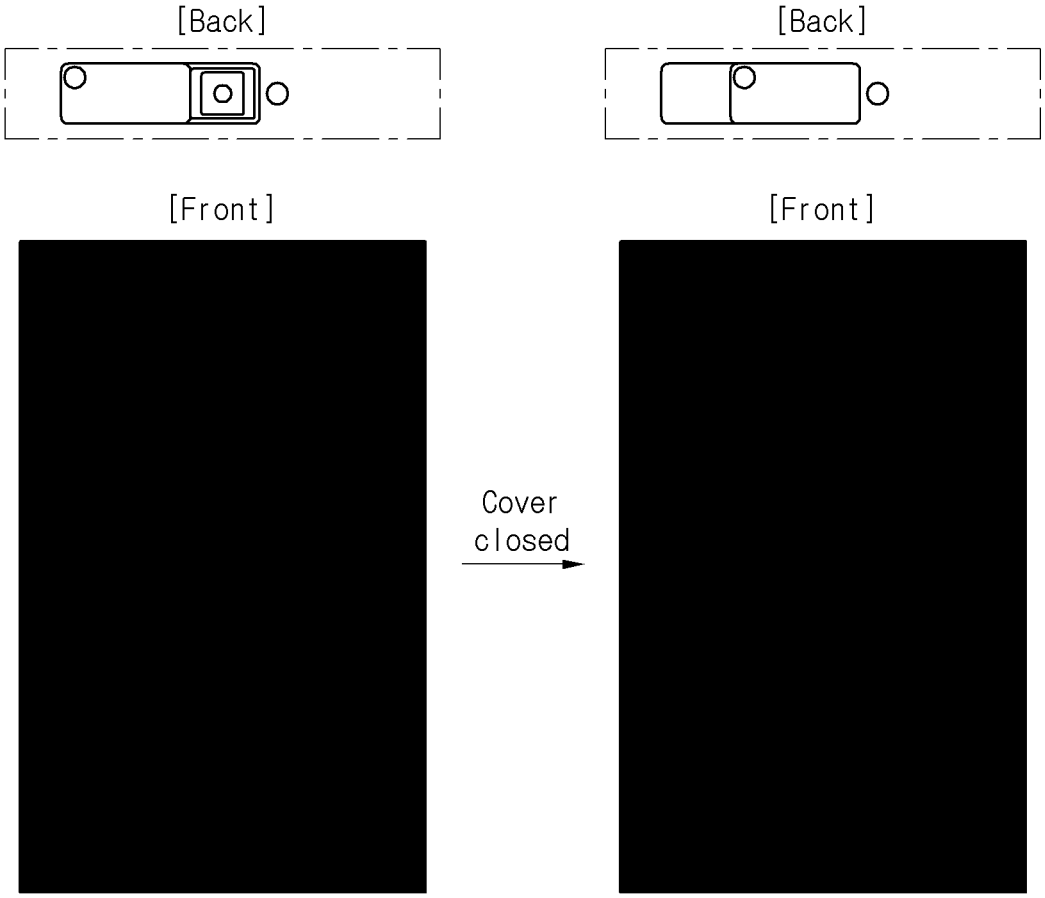


FIG. 18

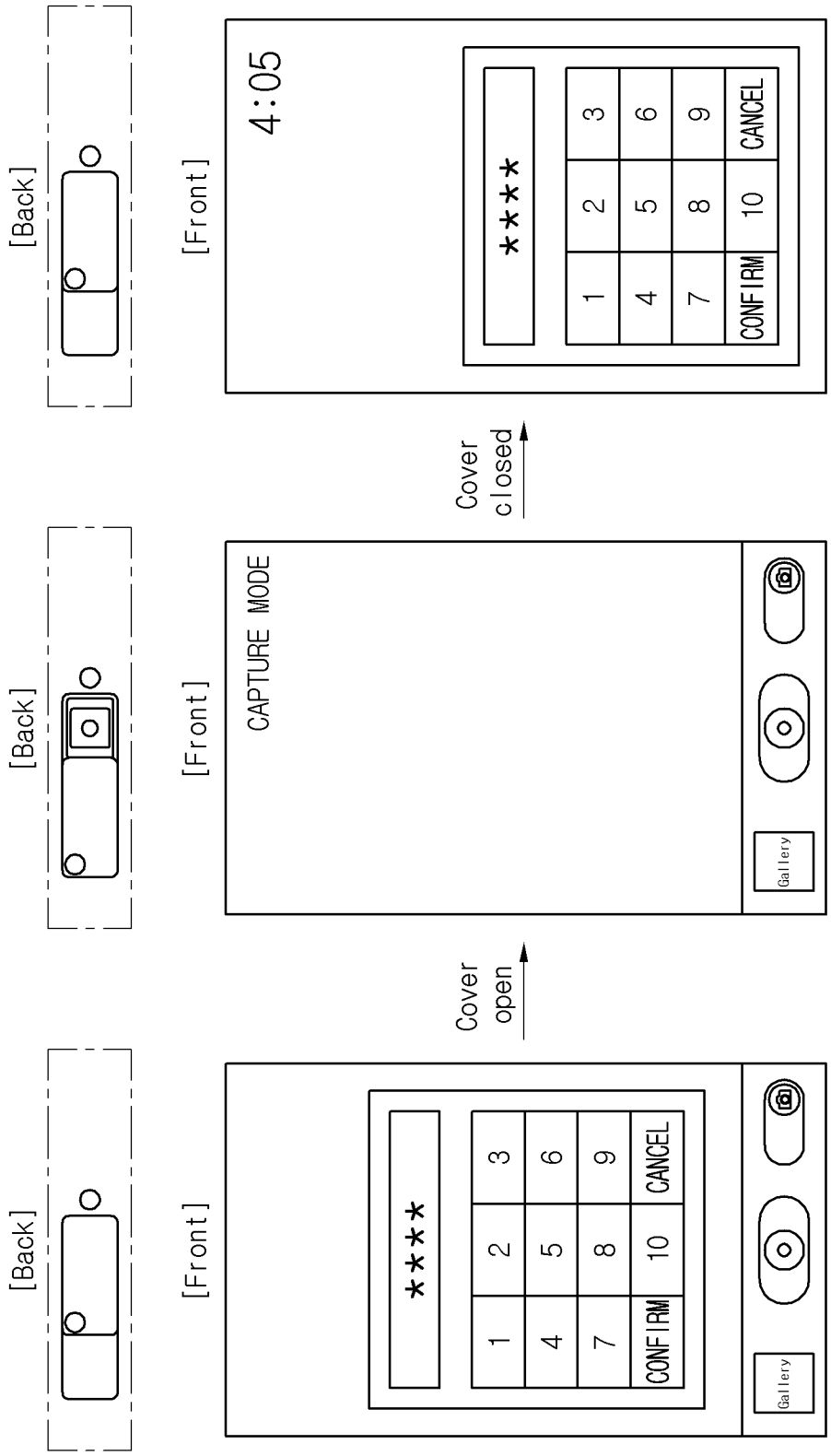
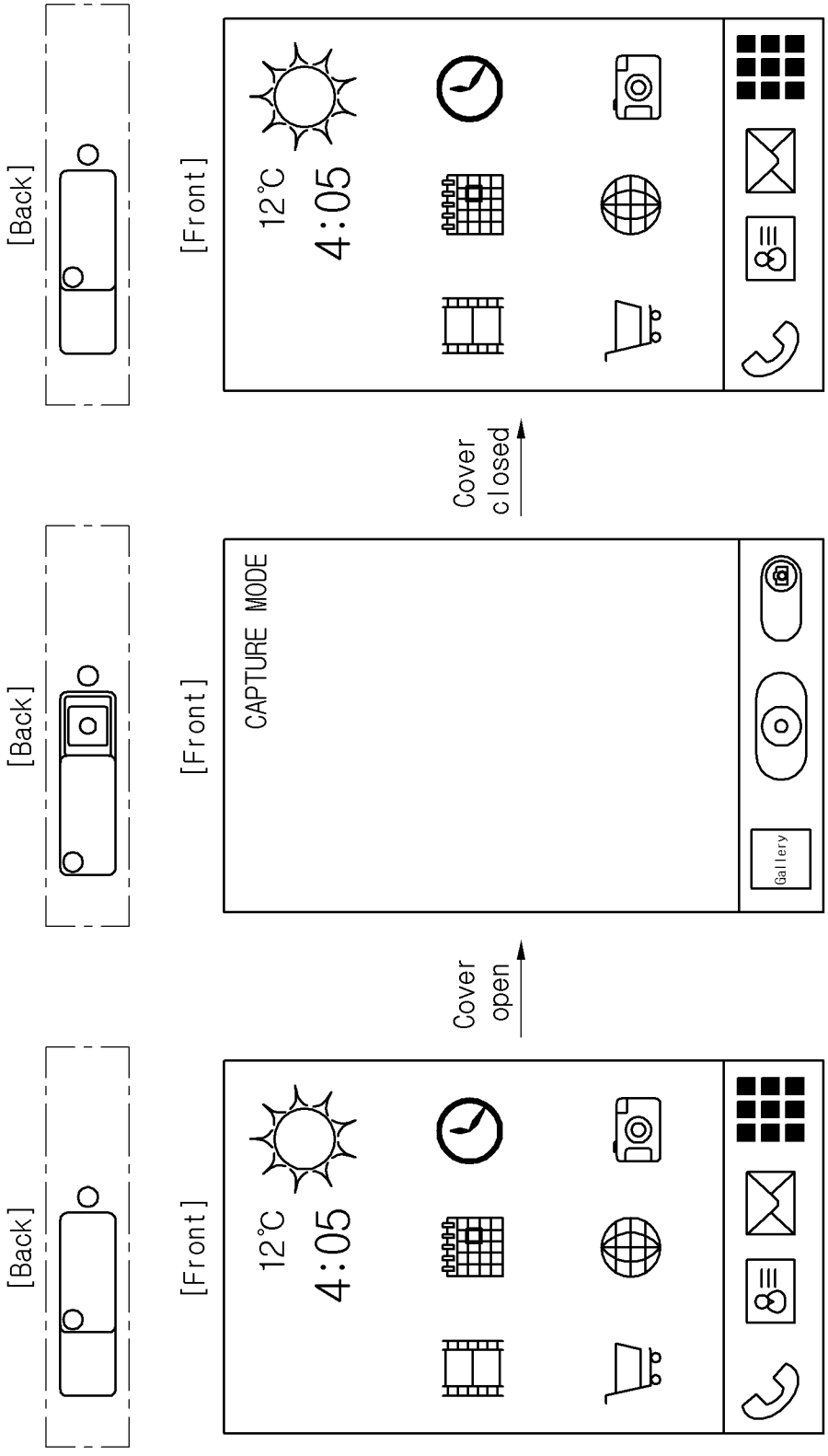

[Back]
[Front]
****
1 2 3
4 5 6
7 8 9
CONFIRM 10 CANCEL
Gallery
Cover open
[Back]
[Front]
CAPTURE MODE
Gallery
Cover closed
[Back]
[Front]
4:05
****
1 2 3
4 5 6
7 8 9
CONFIRM 10 CANCEL

FIG. 19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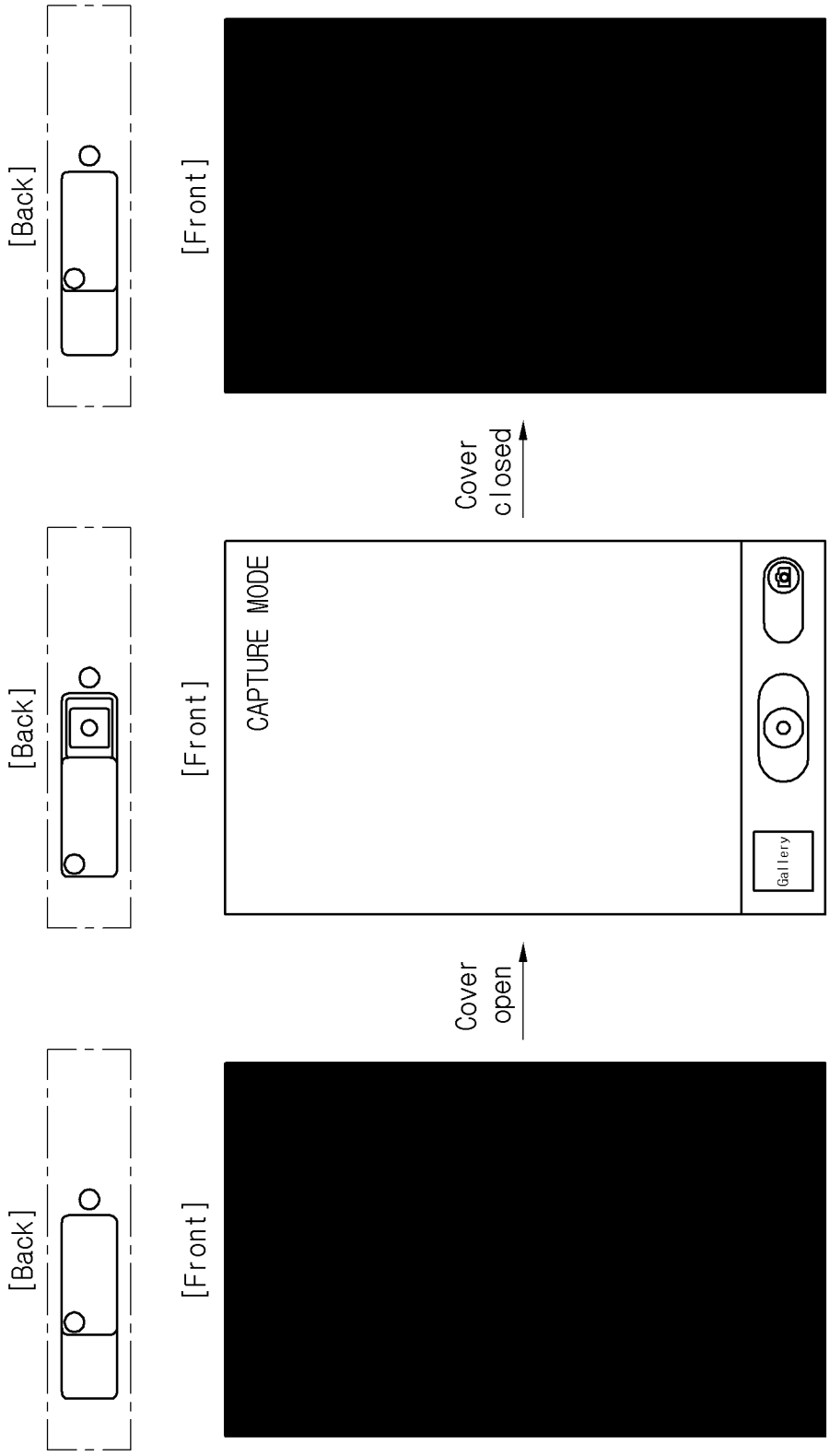
[Front]
12℃
4:05
Cover open
CAPTURE MODE
Gallery
Cover closed

FIG. 20


[Back]
[Front]
Cover closed
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[Front]
CAPTURE MODE
Gallery
Cover open
[Back]
[Front]

FIG. 21

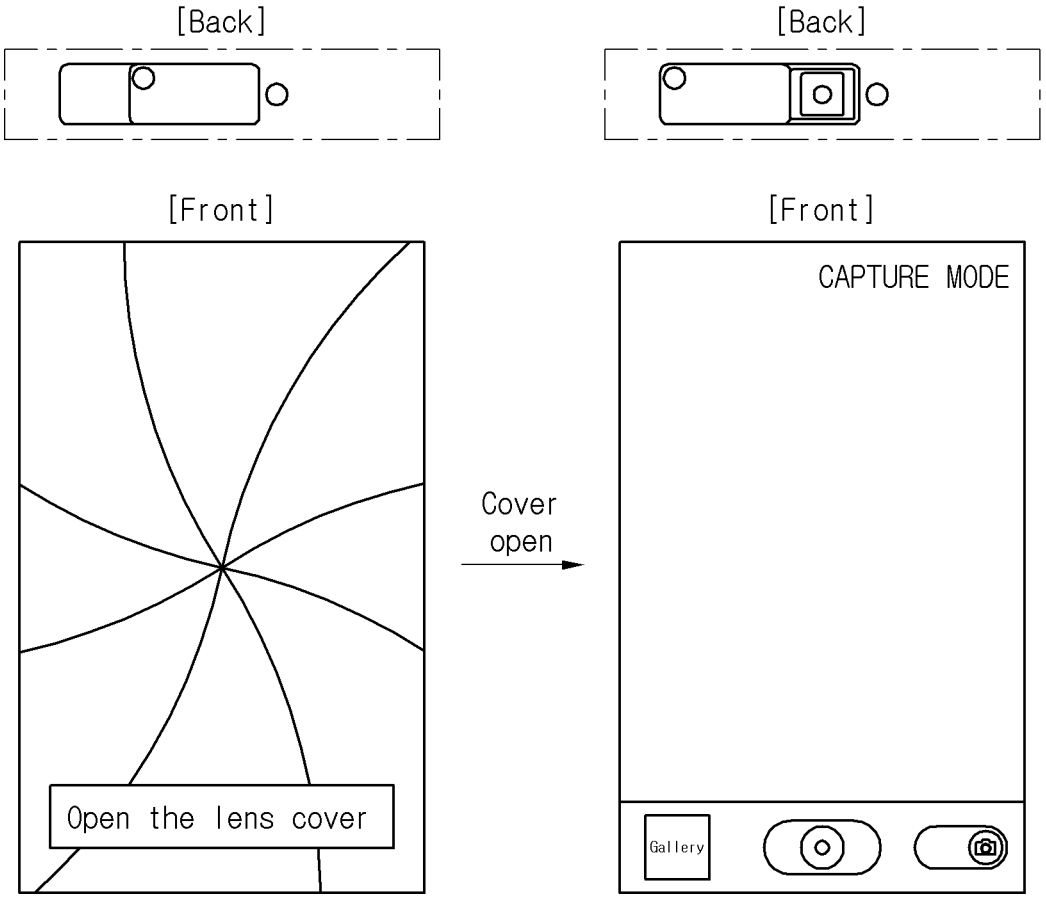

[Back]
[Back]
[Front]
[Front]
CAPTURE MODE
Cover
open
Open the lens cover
Gallery

FIG. 22

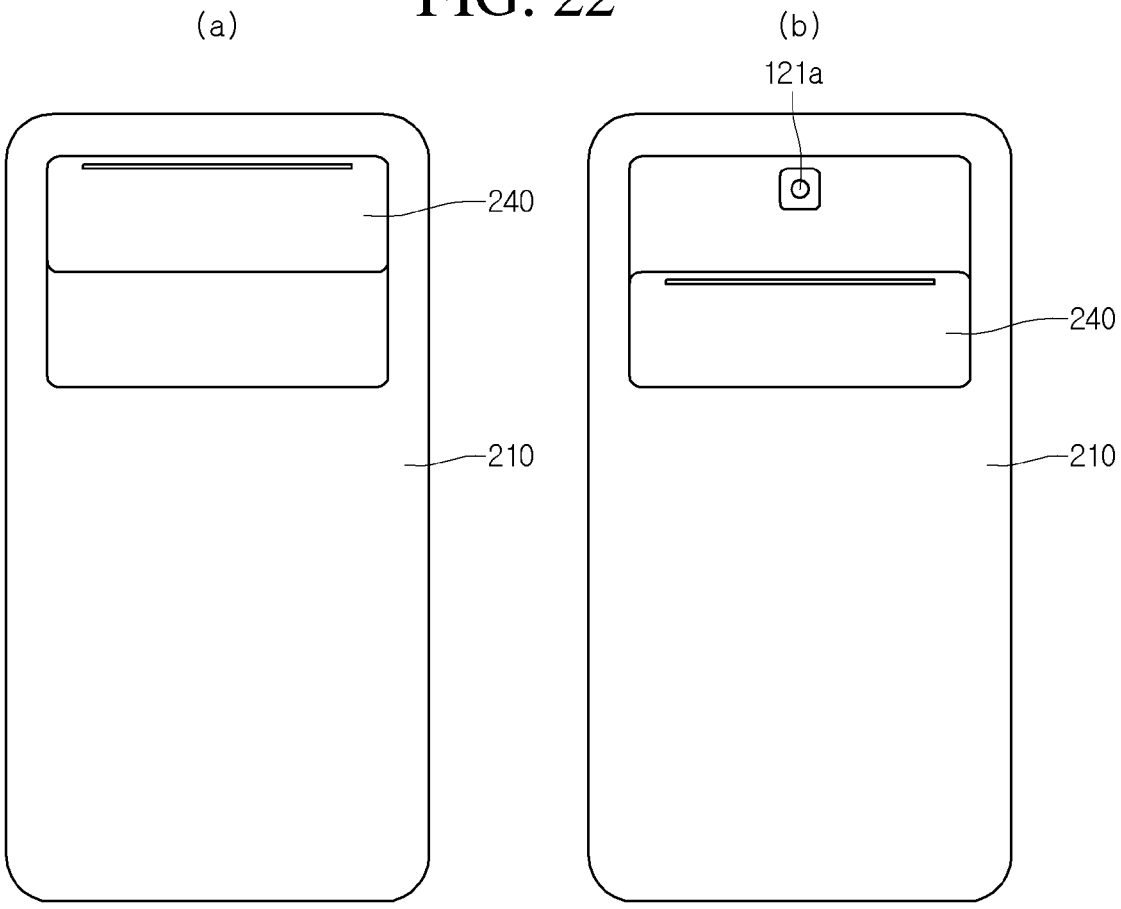


FIG. 23

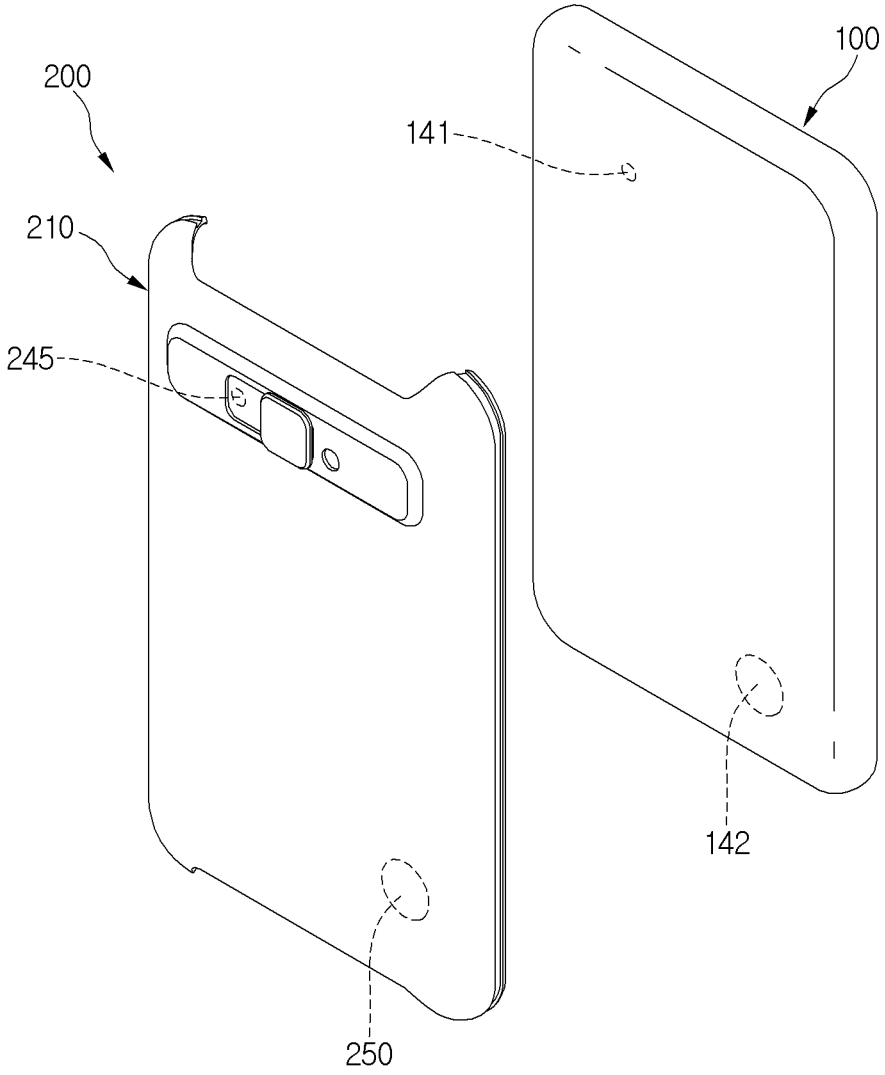


FIG. 24

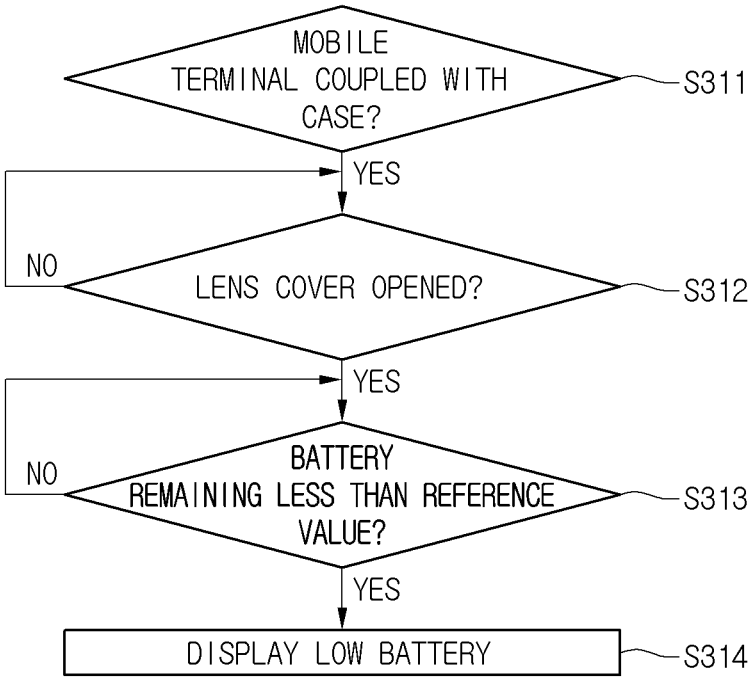

MOBILE TERMINAL COUPLED WITH CASE?
S311
YES
NO
LENS COVER OPENED?
S312
YES
NO
BATTERY REMAINING LESS THAN REFERENCE VALUE?
S313
YES
DISPLAY LOW BATTERY
S314

FIG. 25

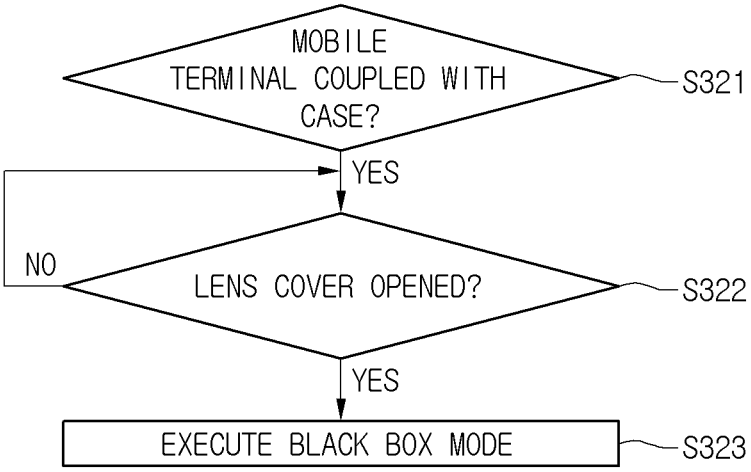

MOBILE TERMINAL COUPLED WITH CASE?
S321
YES
NO
LENS COVER OPENED?
S322
YES
EXECUTE BLACK BOX MODE
S323

FIG. 26

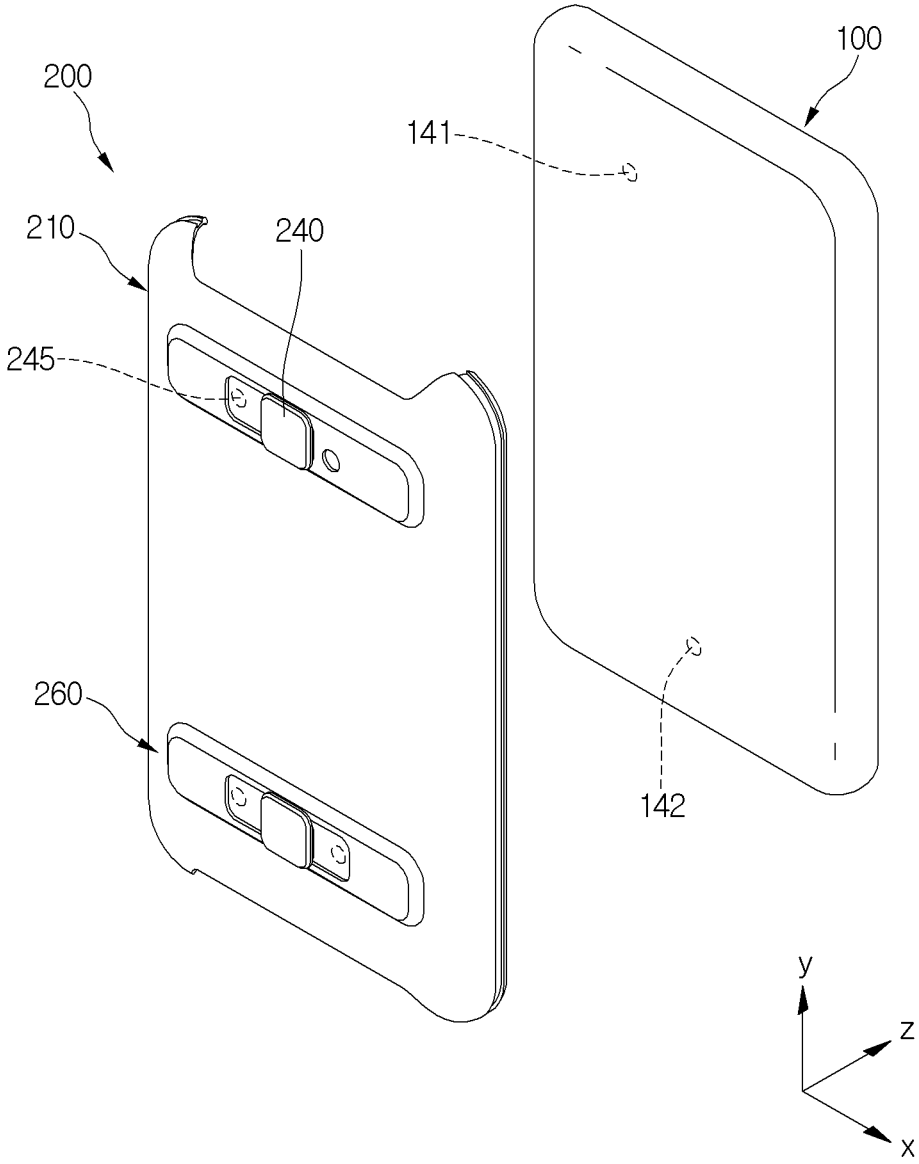


FIG. 27

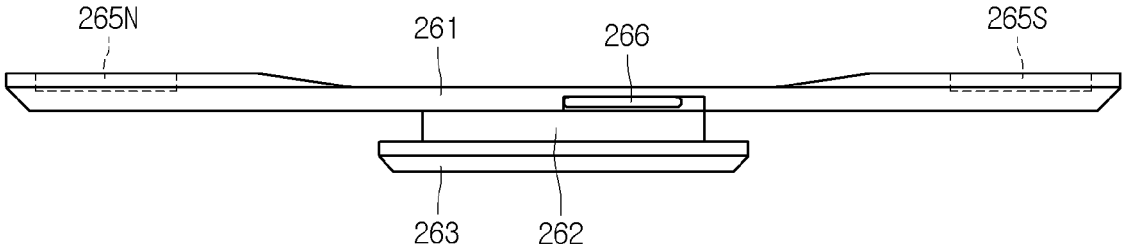
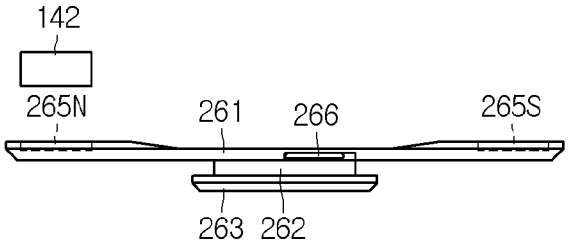
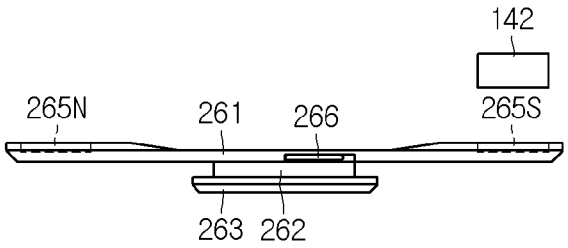


FIG. 28



(a)



(b)

FIG. 29

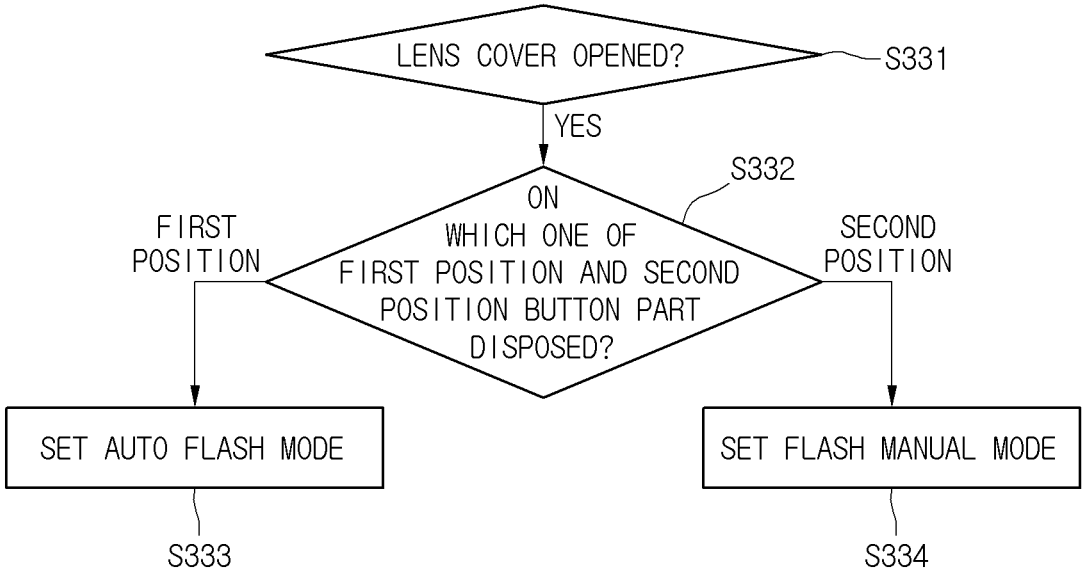

LENS COVER OPENED?
S331
YES
S332
ON WHICH ONE OF FIRST POSITION AND SECOND POSITION BUTTON PART DISPOSED?
FIRST POSITION
SECOND POSITION
SET AUTO FLASH MODE
SET FLASH MANUAL MODE
S333
S334

FIG. 30

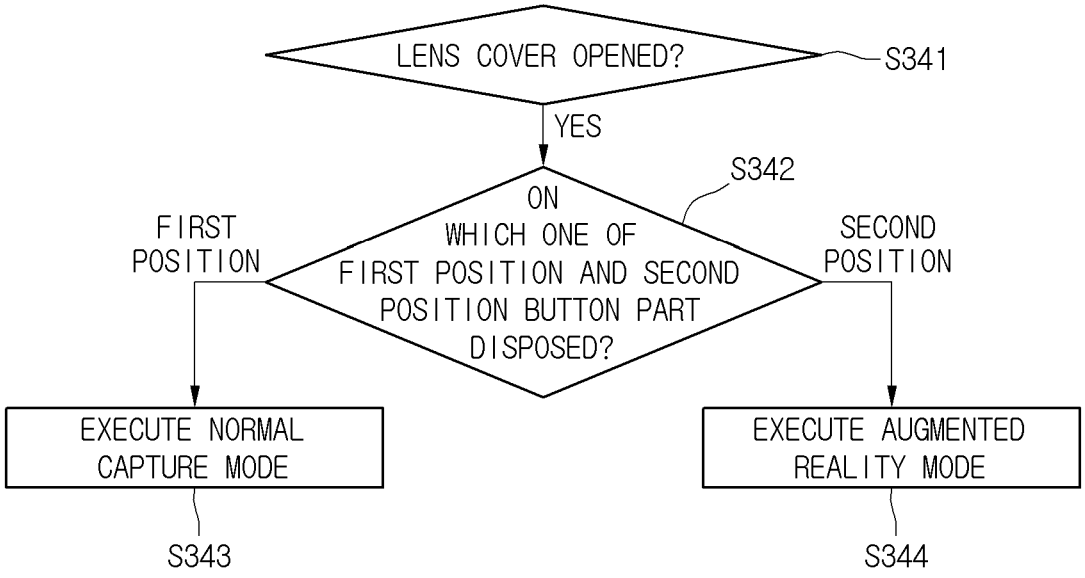

LENS COVER OPENED?
S341
YES
S342
ON WHICH ONE OF FIRST POSITION AND SECOND POSITION BUTTON PART DISPOSED?
FIRST POSITION
SECOND POSITION
EXECUTE NORMAL CAPTURE MODE
EXECUTE AUGMENTED REALITY MODE
S343
S344

FIG. 31

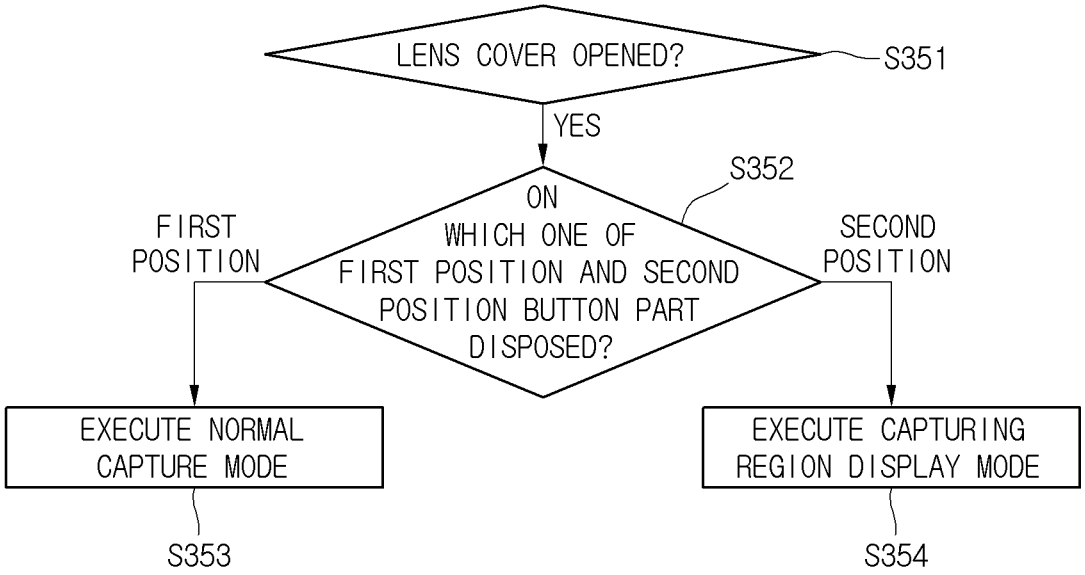

LENS COVER OPENED?
S351
YES
S352
ON WHICH ONE OF FIRST POSITION AND SECOND POSITION BUTTON PART DISPOSED?
FIRST POSITION
SECOND POSITION
EXECUTE NORMAL CAPTURE MODE
EXECUTE CAPTURING REGION DISPLAY MODE
S353
S354

FIG. 32

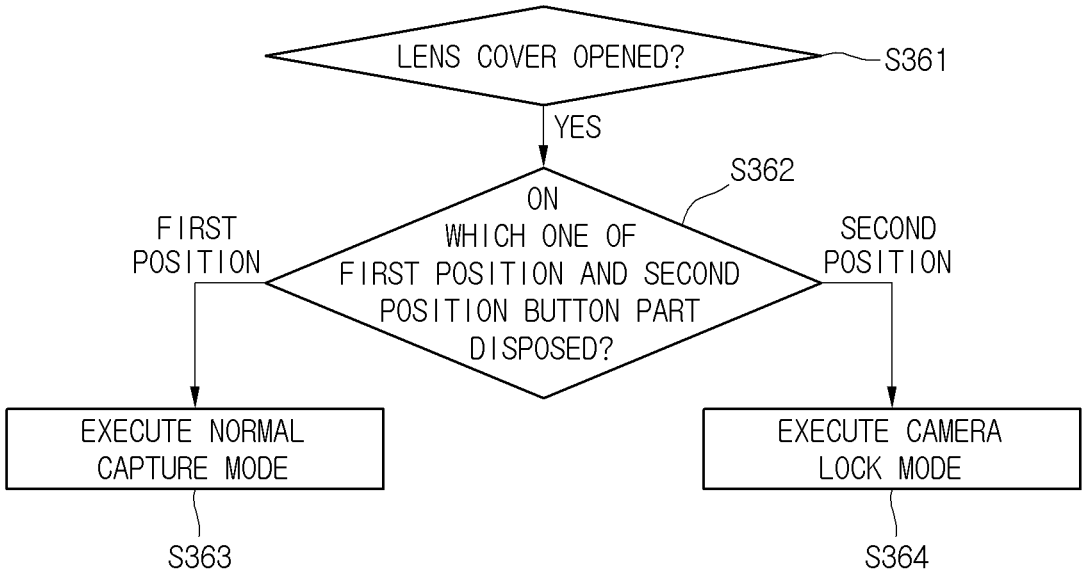

LENS COVER OPENED?
S361
YES
S362
ON WHICH ONE OF FIRST POSITION AND SECOND POSITION BUTTON PART DISPOSED?
FIRST POSITION
SECOND POSITION
EXECUTE NORMAL CAPTURE MODE
EXECUTE CAMERA LOCK MODE
S363
S364

FIG. 33

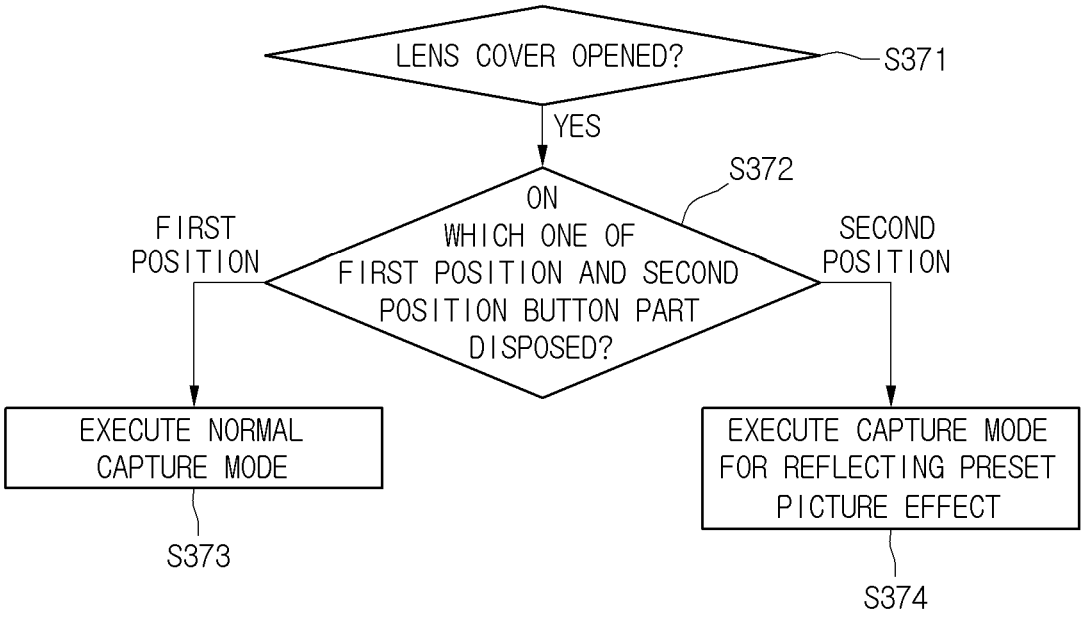

LENS COVER OPENED?
S371
YES
S372
ON WHICH ONE OF FIRST POSITION AND SECOND POSITION BUTTON PART DISPOSED?
FIRST POSITION
SECOND POSITION
EXECUTE NORMAL CAPTURE MODE
S373
EXECUTE CAPTURE MODE FOR REFLECTING PRESET PICTURE EFFECT
S374

FIG. 34

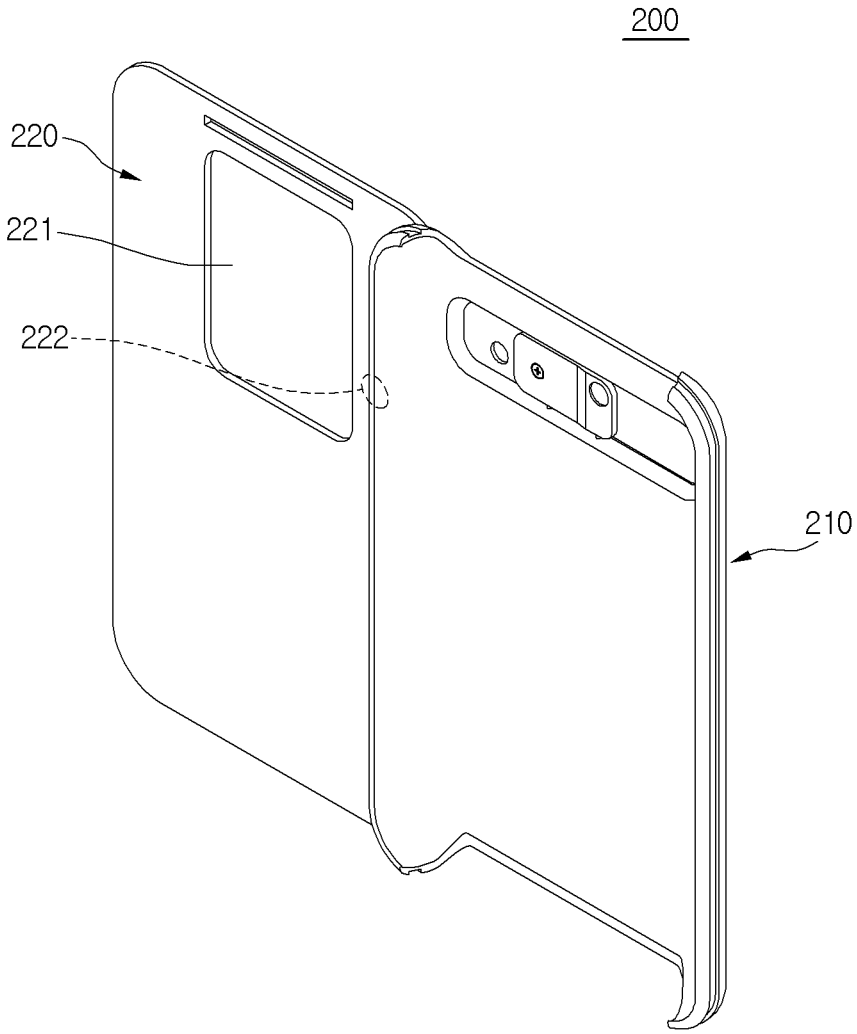


FIG. 35

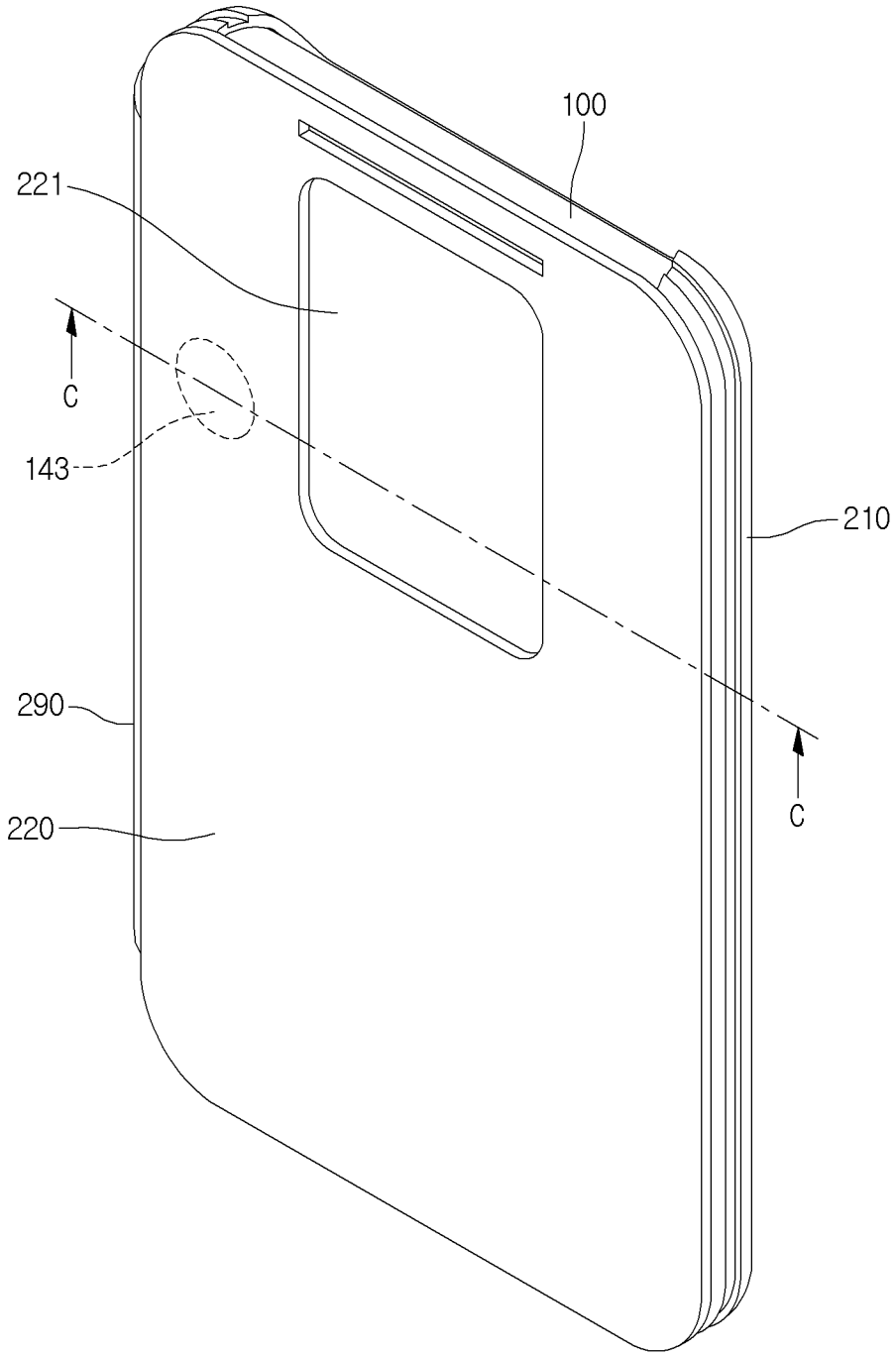


FIG. 36

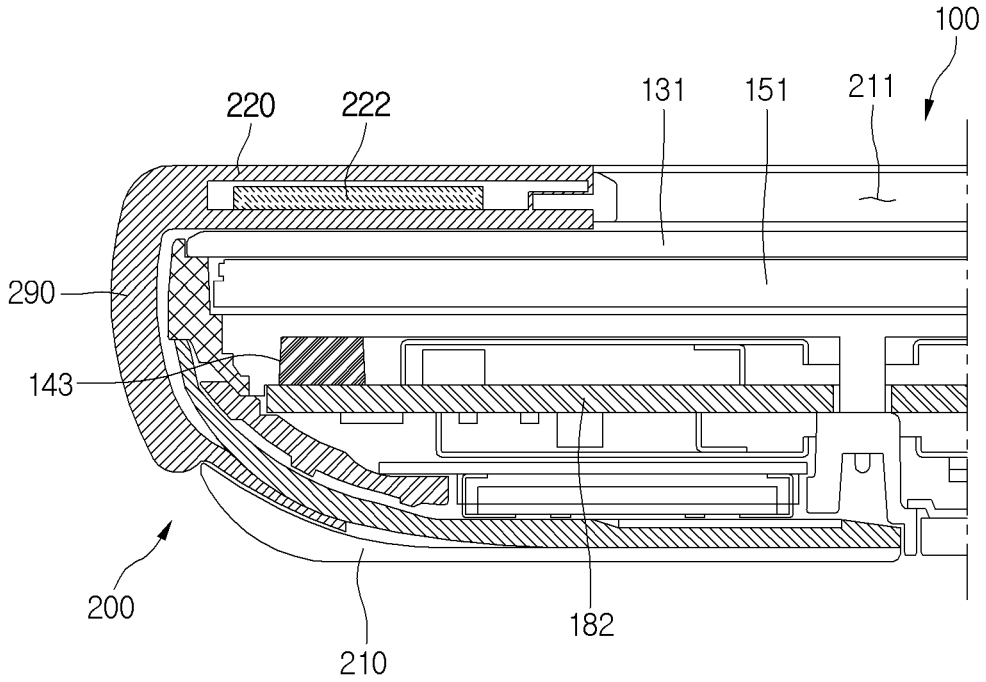


FIG. 37

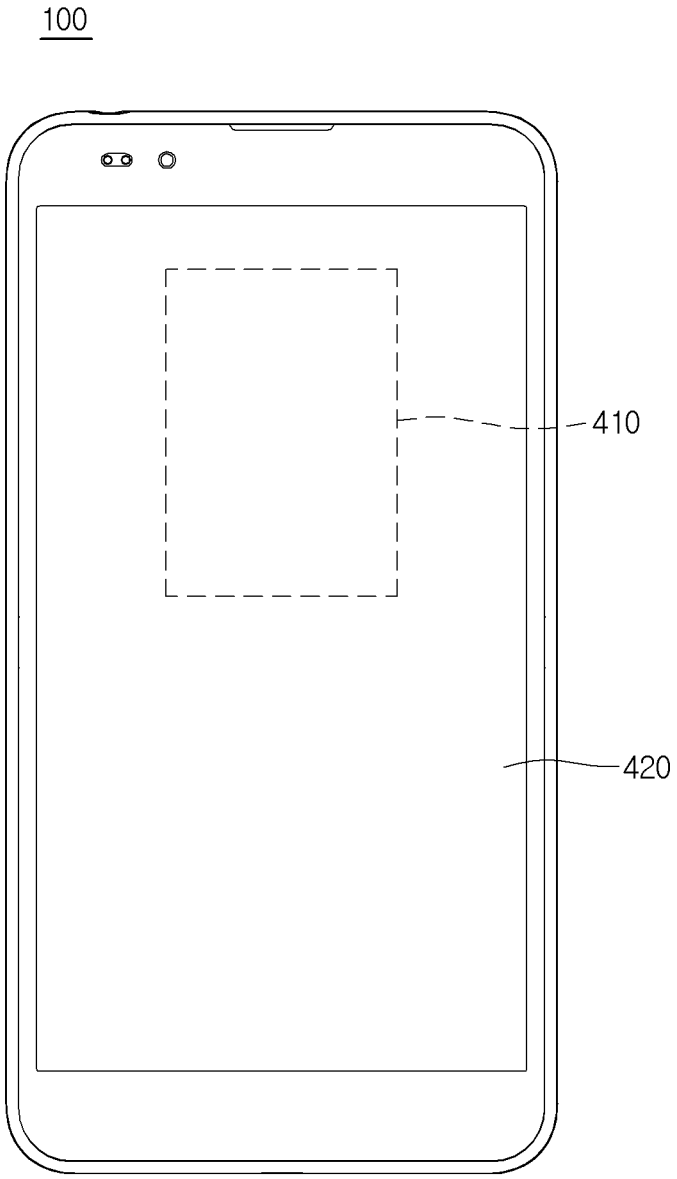


FIG. 38

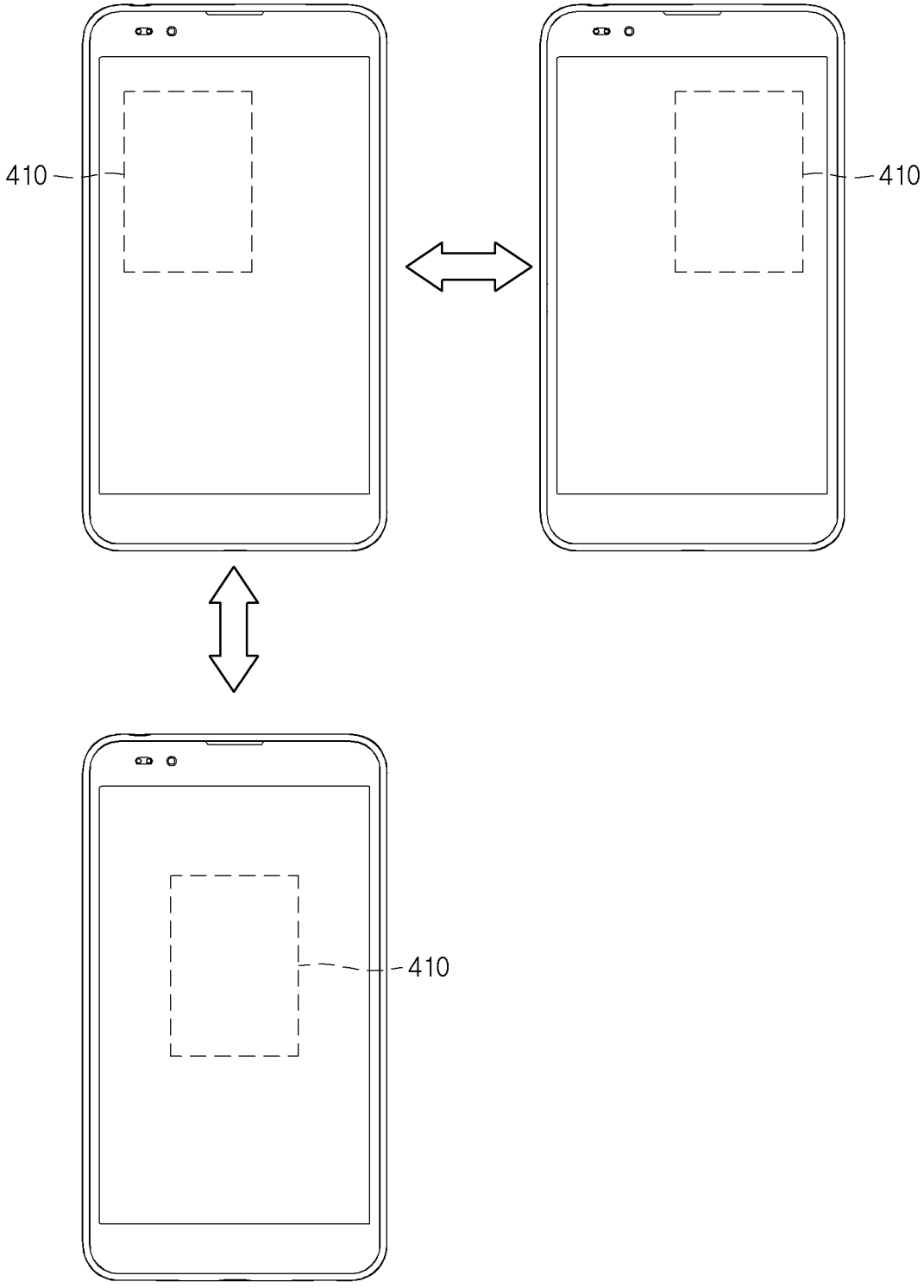


FIG. 39

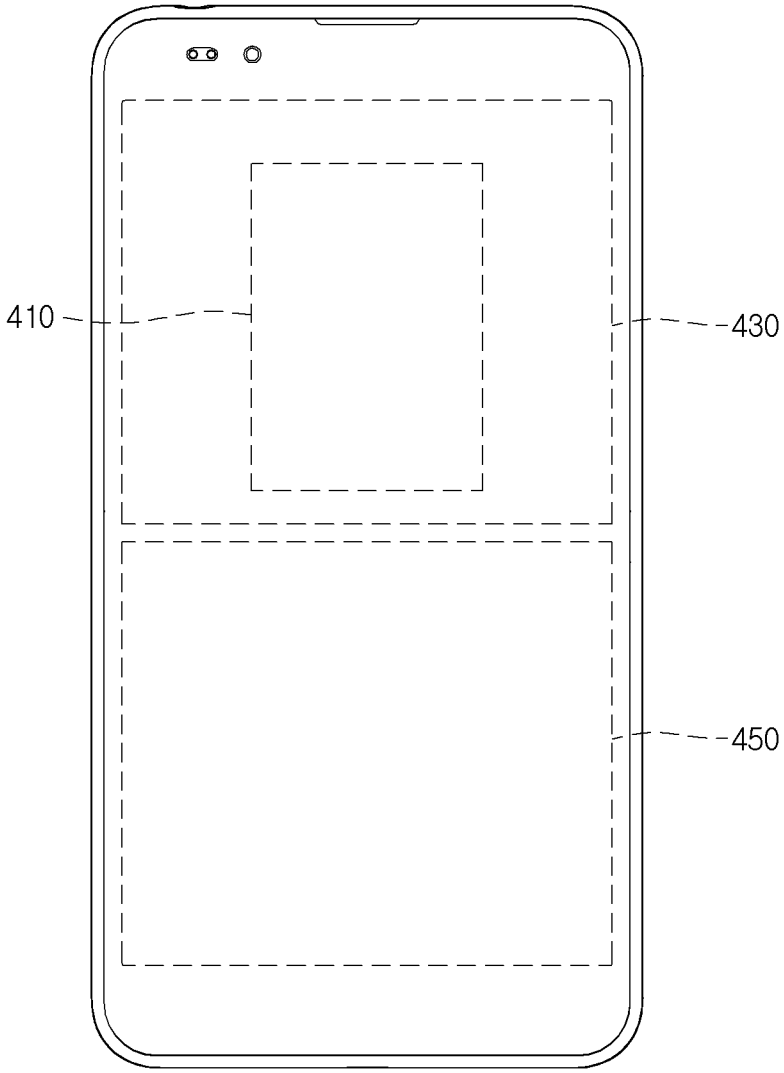


FIG. 40

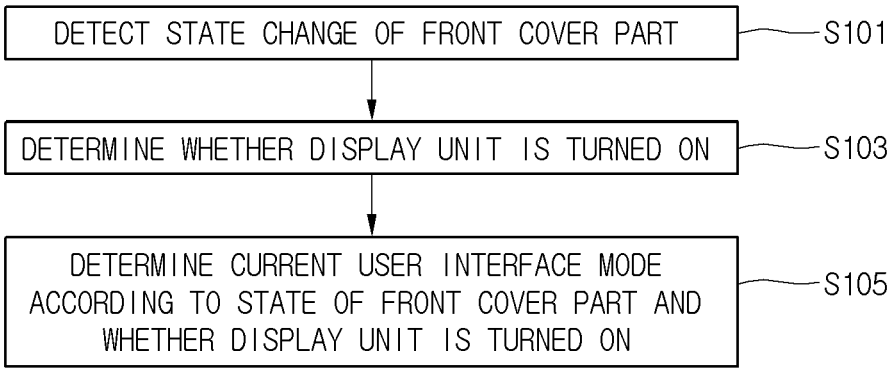

DETECT STATE CHANGE OF FRONT COVER PART
S101
DETERMINE WHETHER DISPLAY UNIT IS TURNED ON
S103
DETERMINE CURRENT USER INTERFACE MODE ACCORDING TO STATE OF FRONT COVER PART AND WHETHER DISPLAY UNIT IS TURNED ON
S105

FIG. 41

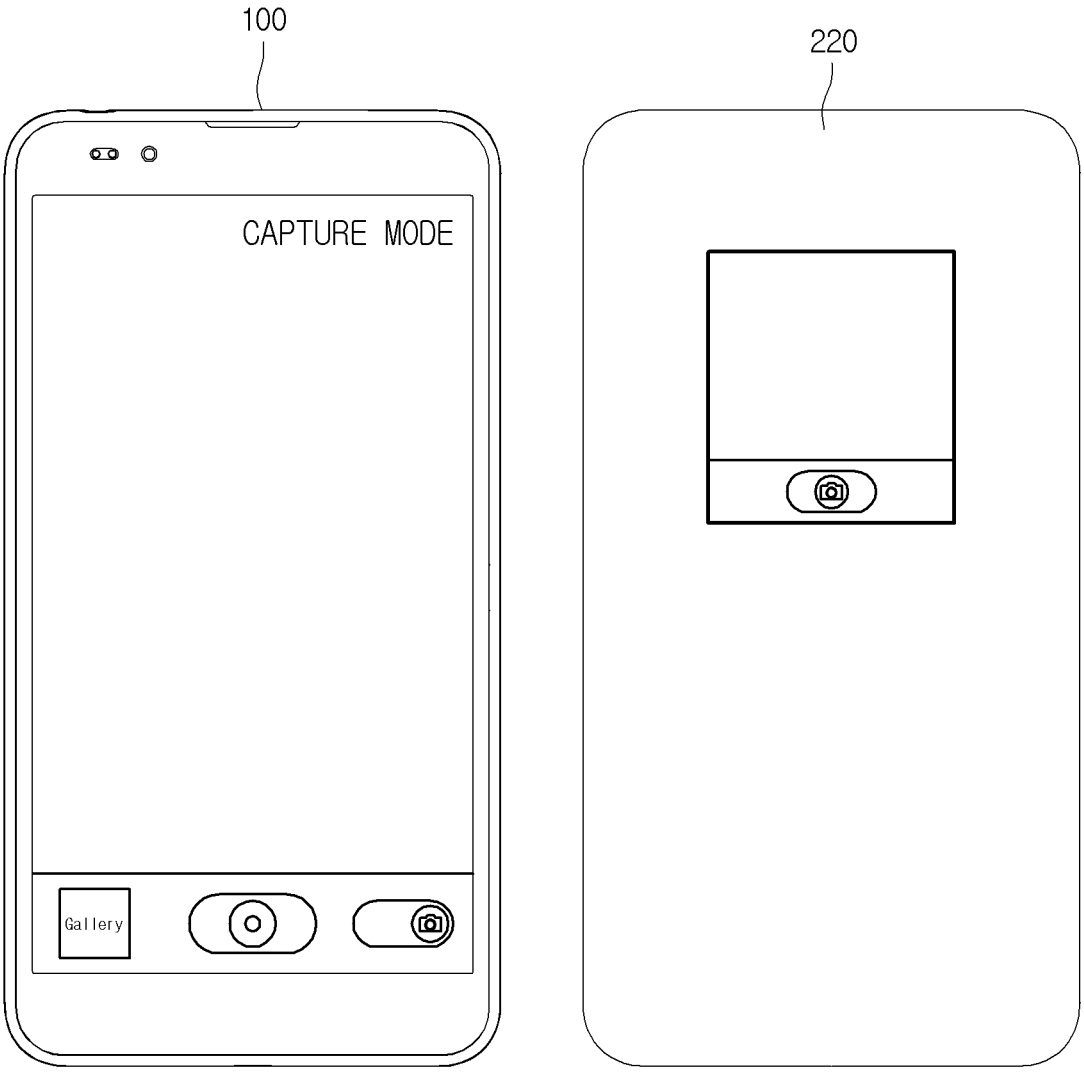


FIG. 42

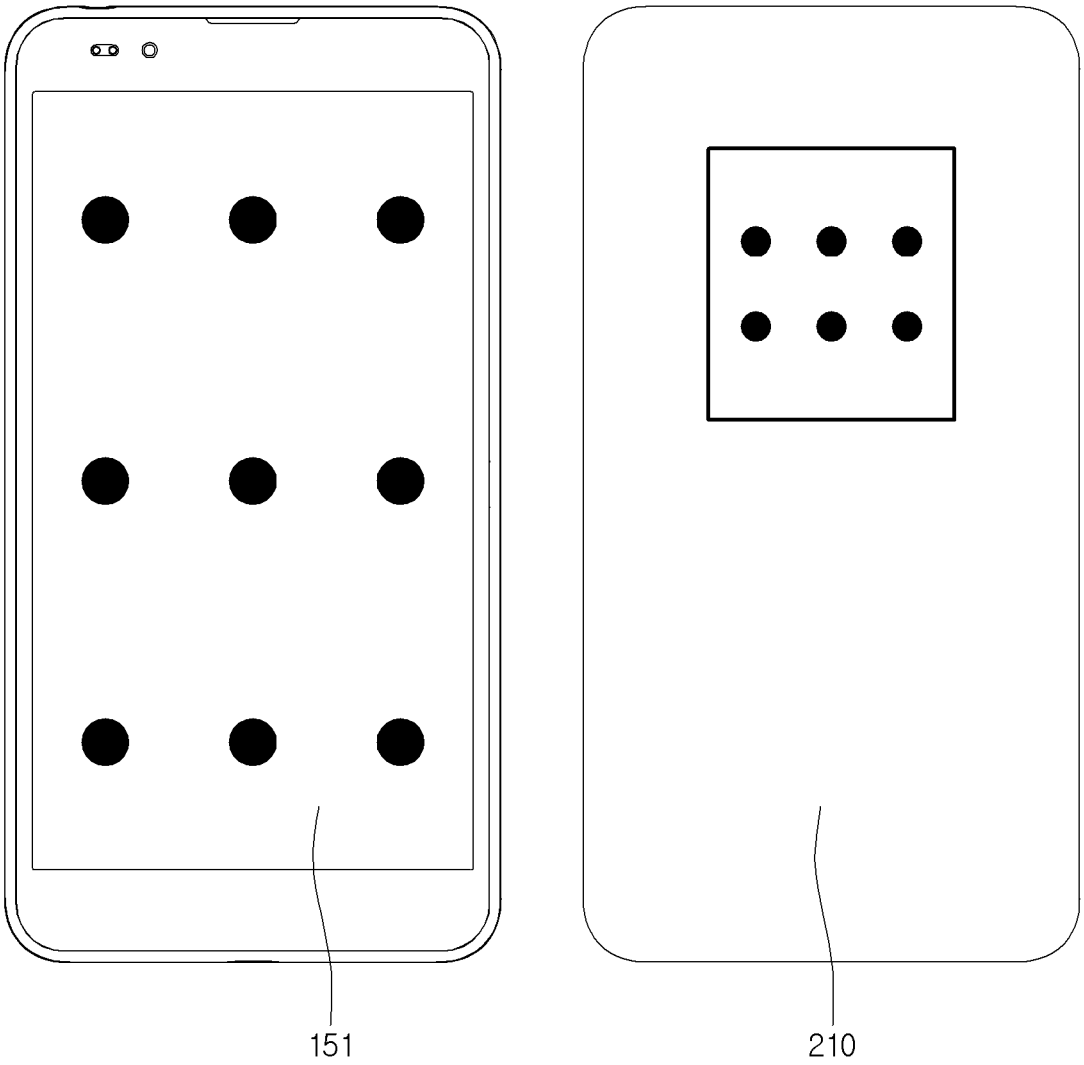


FIG. 43

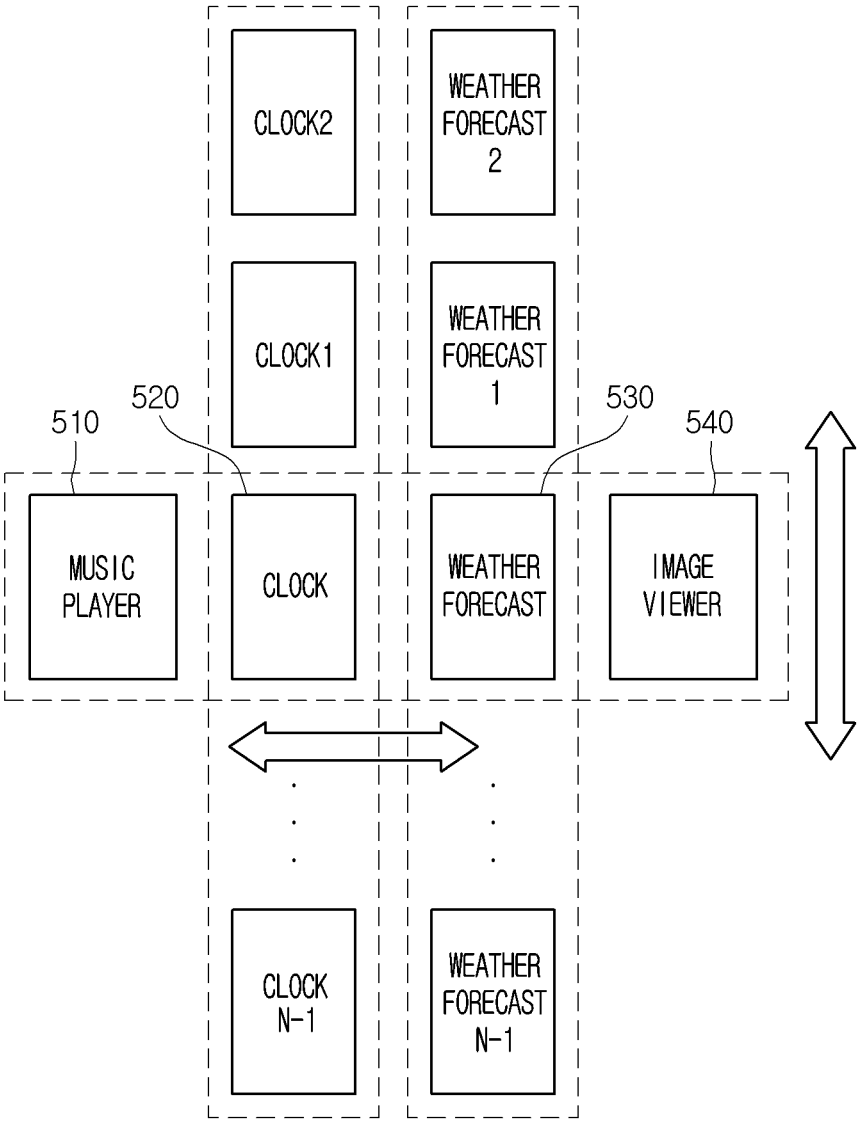

CLOCK2
WEATHER FORECAST 2
CLOCK1
WEATHER FORECAST 1
510
520
530
540
MUSIC PLAYER
CLOCK
WEATHER FORECAST
IMAGE VIEWER
CLOCK N-1
WEATHER FORECAST N-1

FIG. 44

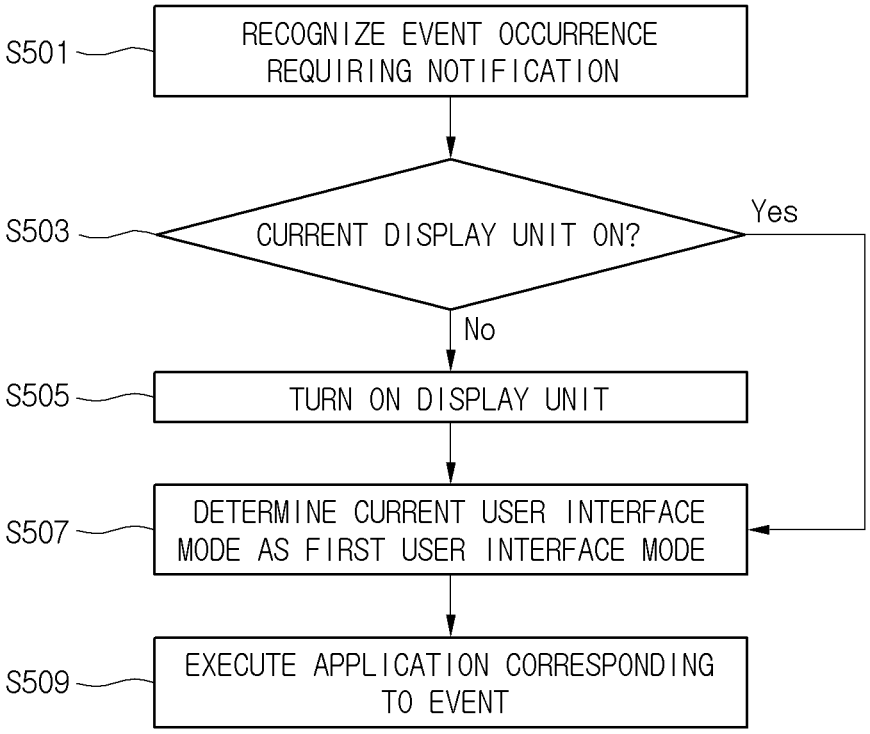

S501
RECOGNIZE EVENT OCCURRENCE REQUIRING NOTIFICATION
S503
CURRENT DISPLAY UNIT ON?
Yes
No
S505
TURN ON DISPLAY UNIT
S507
DETERMINE CURRENT USER INTERFACE MODE AS FIRST USER INTERFACE MODE
S509
EXECUTE APPLICATION CORRESPONDING TO EVENT

FIG. 45

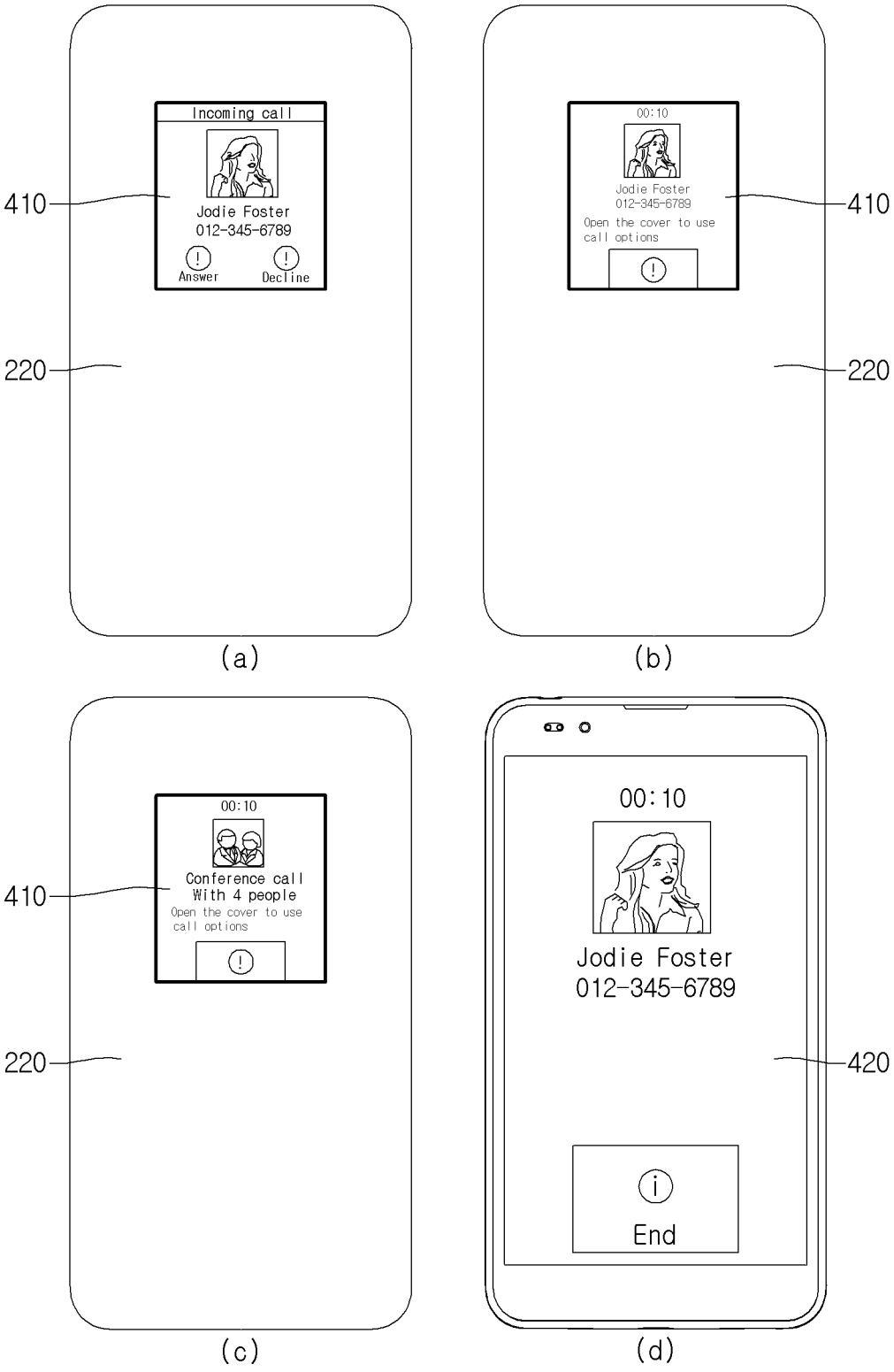

Incoming call
Jodie Foster
012-345-6789
Answer
Decline
410
220
(a)
00:10
Jodie Foster
012-345-6789
Open the cover to use call options
410
220
(b)
00:10
Conference call
With 4 people
Open the cover to use call options
410
220
(c)
00:10
Jodie Foster
012-345-6789
End
420
(d)

FIG. 46

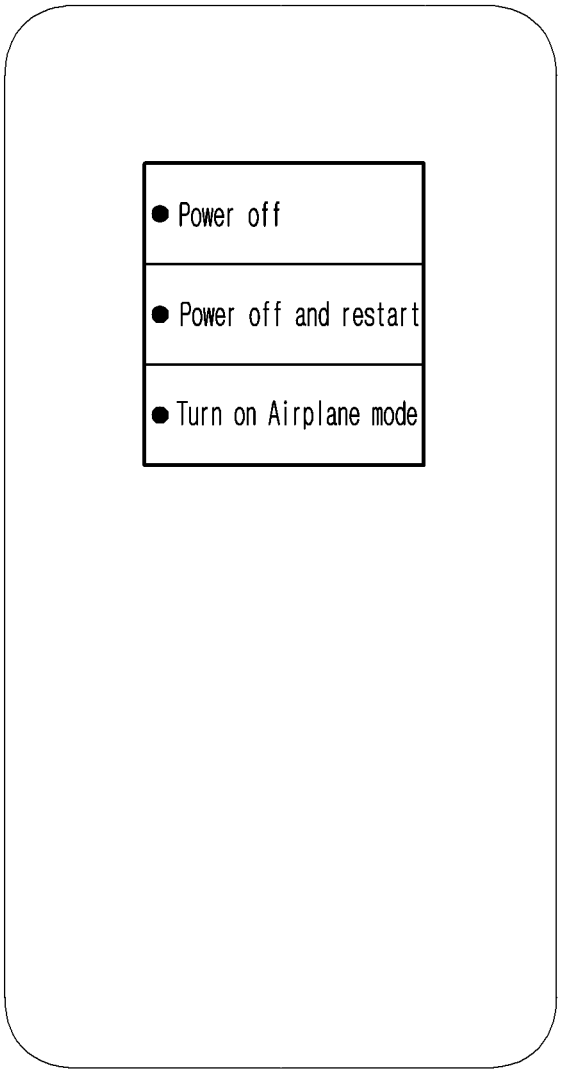


FIG. 47

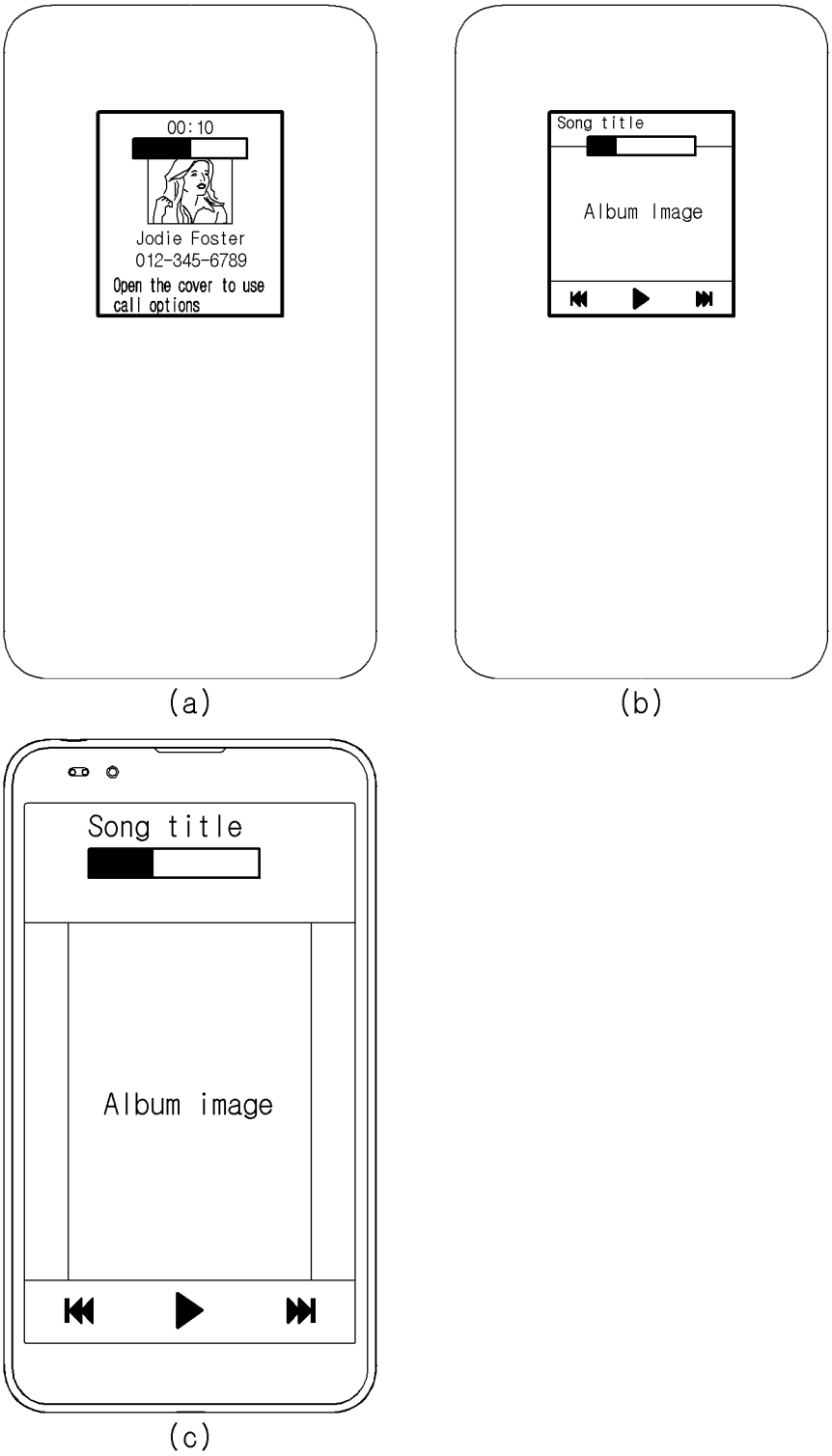

00:10
Jodie Foster
012-345-6789
Open the cover to use call options
(a)
Song title
Album Image
(b)
Song title
Album image
(c)

FIG. 48

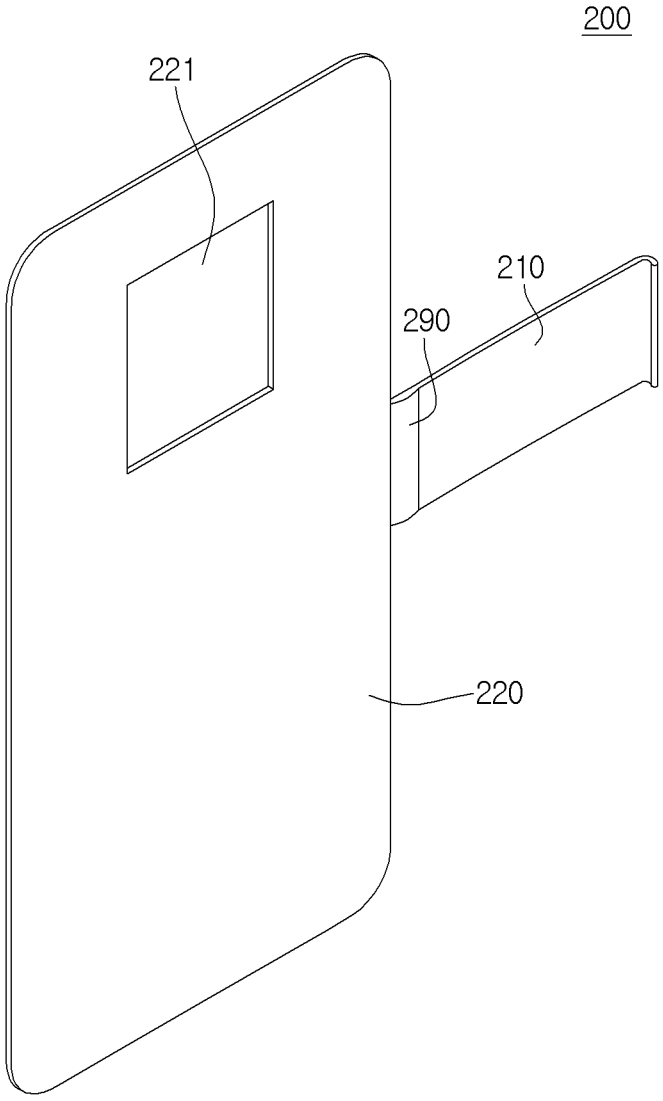


FIG. 49

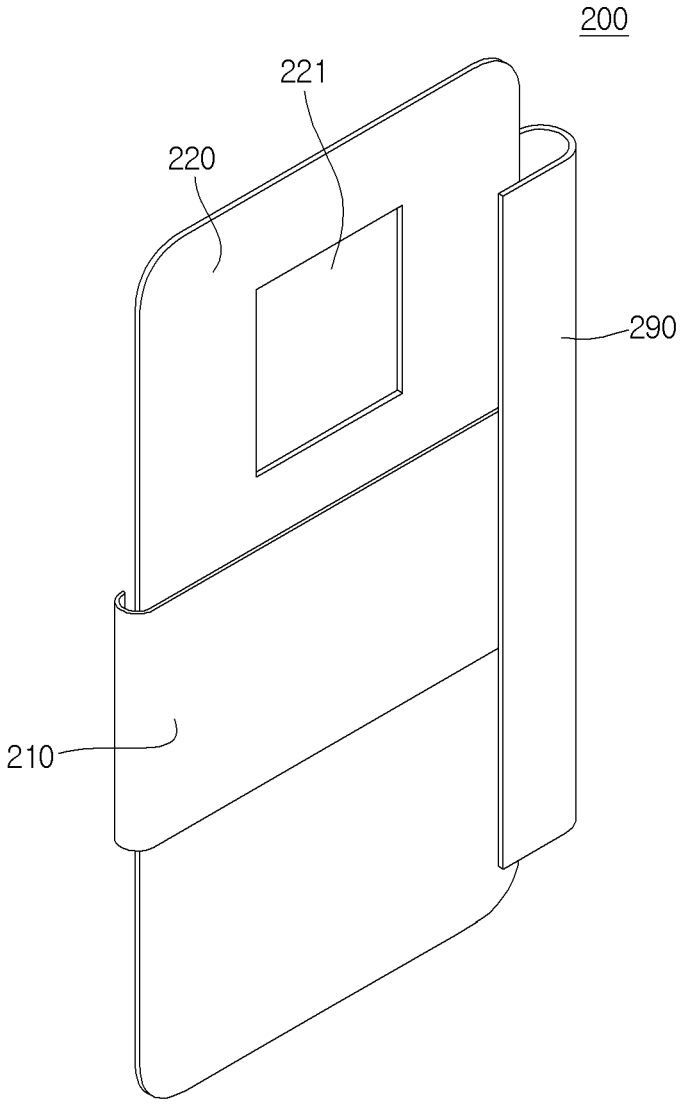
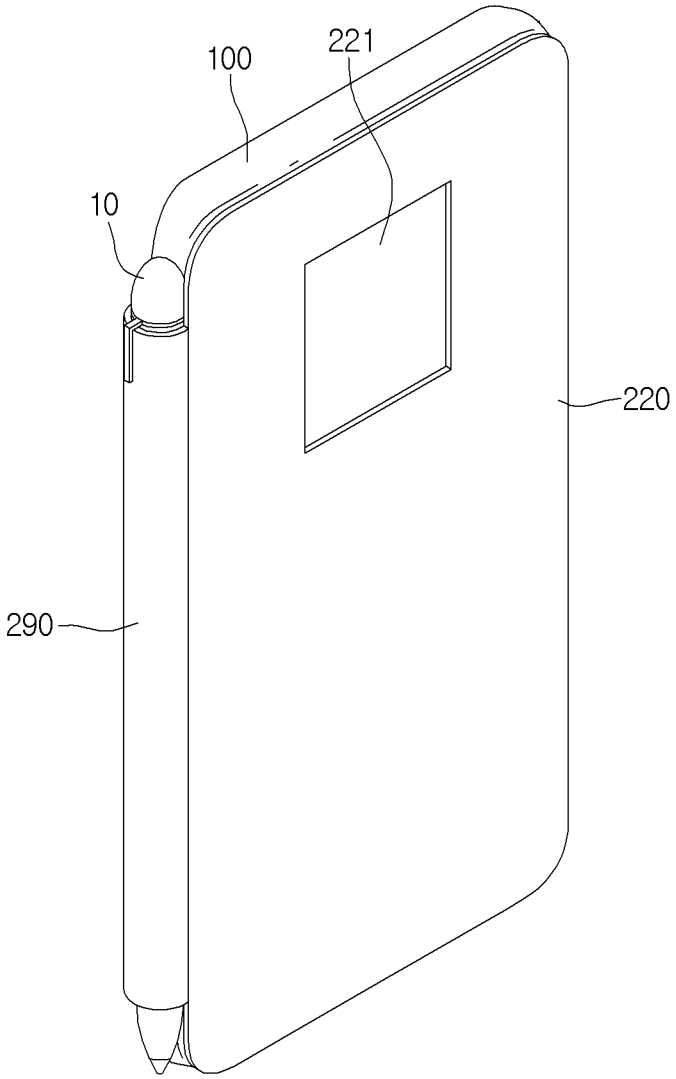


FIG. 50



TERMINAL CASE, MOBILE TERMINAL, AND MOBILE TERMINAL ASSEMBLY INCLUDING THE TERMINAL CASE AND THE MOBILE TERMINAL

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority under 35 U.S.C. 119 and 35 U.S.C. 365 to Korean Patent Application No. 10-2013-0051523 filed on May 7, 2013 and 10-2013-0064710 filed on Jun. 5, 2013 which are hereby incorporated by reference in its entirety.

BACKGROUND

The present disclosure relates to a terminal case, a mobile terminal, and a mobile terminal assembly including the terminal case and the mobile terminal.

As the touch recognition of a touch screen and a user interface therefor develop, the touch screen becomes used for a mobile terminal generally. Additionally, the touch screen becomes larger and a bezel part of a mobile terminal becomes thinner. However, the touch screen of a mobile terminal may be damaged due to the impact of crash. According to the recent trend, that is, as the touch screen becomes larger and the bezel part becomes thinner, such risks may be greater.

Accordingly, users may use various types of terminal cases so as to protect the mobile terminals from such risks.

A typical terminal case includes a terminal coupling part detachable from the rear of a mobile terminal and/or a front cover part covering the front of the mobile terminal.

The terminal coupling part covers the rear of the mobile terminal. At this point, a portion corresponding to a camera lens is generally incised to expose the camera lens to the outside. Accordingly, even when a terminal case is coupled to a mobile terminal, since a camera lens at the rear of the mobile terminal is exposed to the outside, a camera lens scratch occurs. Therefore, the quality and performance of the camera lens may be deteriorated.

Moreover, in order to prevent this, as a means for protecting the camera lens is attached to the mobile terminal, the volume of the mobile terminal becomes larger and the external design quality becomes deteriorated.

Moreover, when shooting by using a camera module built in a typical mobile terminal, due to a time for turning on a display unit and searching for and executing a camera application, a user may miss the moment that needs to be taken for a picture immediately.

Moreover, when a front cover part is equipped at a terminal case, it may protect a touch screen stably compared to another case. However, when the front cover part is closed, a user cannot check the contents on the touch screen of the mobile terminal and cannot provide an input through the touch screen of the mobile terminal. Accordingly, in order to check a simple content or provide a simple input, a user needs to open the front cover part, and then check the contents displayed on the touch screen or provide a touch input inconveniently.

SUMMARY

Embodiments provide a terminal case, a mobile terminal, and a mobile terminal assembly including the mobile terminal and the terminal case.

In order to solve the above-mentioned issues, a means for protecting a camera lens of a mobile terminal is equipped at an additional terminal case detachable from the mobile terminal, so that the camera lens may be protected while maintaining the slim and elegant appearance of the mobile terminal.

Additionally, by promptly executing a camera application so that instant switching to a capture mode is possible, the damage of a lens part of a mobile terminal may be prevented.

Additionally, the contents displayed on a touch screen may be checked without opening a front cover part for protecting a touch screen and also a touch input may be possible.

In one embodiment, a mobile terminal assembly includes: a terminal case; and a mobile terminal detachable from the terminal case, wherein the terminal case comprises: a case body; and a lens cover openably disposed in the case body, wherein the mobile terminal comprises: a display unit; a camera module including a camera lens disposed at a position corresponding to the lens cover; a lens cover sensing unit sensing whether the lens cover is opened or closed; and a control unit configured to execute a camera application on the basis of whether the lens cover is opened or closed.

In one embodiment, provided is a mobile terminal detachable from a terminal case including a rear incision part and a lens cover capable of opening or closing the rear incision part, the mobile terminal comprising: a display unit; a touch input unit receiving a touch input; a camera module including a camera lens disposed at a position corresponding to the lens cover; a lens cover sensing unit sensing whether the lens cover is opened or closed; and a control unit configured to display a preset user interface through the display unit on the basis of whether the lens cover is opened or closed.

In one embodiment, provided is a mobile terminal detachable from a terminal case, comprising: a rear incision part; a lens cover capable of opening or closing the rear incision part; a button part movably provided; first and second polar magnets coupled with the button part; a display unit; a camera module including a camera lens disposed at a position corresponding to the lens cover; a lens cover sensing unit sensing whether the lens cover is opened or closed; a case coupling sensing unit sensing a position of the button part of the terminal case through magnetic fields of the first and second polar magnets; and a control unit configured to display a preset user interface through the display unit on the basis of whether the lens cover is opened or closed and the position of the button part, wherein the control unit is configured to determine the position of the button part as a first position when the magnetic field of the first polar magnet is sensed by the case coupling sensing unit, and determines the position of the button as a second position when the magnetic field of the second polar magnet is sensed by the case coupling sensing unit.

In one embodiment, provided is a mobile terminal detachable from a terminal case, comprising: a case body of which a front surface is opened and having a rear incision part defined in a rear surface thereof; a front cover part rotatably coupled with the case body to open or close the opened front surface of the case body and having a front incision part; and a lens cover capable of opening or closing the rear incision part; a camera module including a camera lens disposed at a position corresponding to the rear incision part; a display unit displaying an image; a lens cover sensing unit sensing whether the lens cover is opened or closed; a front cover sensing unit sensing whether the front cover part is opened or closed; and a control unit configured to control an execution of a camera application according to whether the lens cover is opened or closed, wherein the control unit is configured to display a user interface in an area corresponding to the front incision part of the display unit when the front cover is closed.

In one embodiment, provided is a terminal case detachable from an outer of a mobile terminal having a camera lens, comprising: a case body having one side opened to be coupled with a mobile terminal; a lens cover mounting part formed at the case body; a rear incision part formed at a position corresponding to the camera lens of the mobile terminal in the lens cover mounting part; a lens cover coupled to the lens cover mounting part to allow the rear incision part to be opened or closed; and a lens cover magnet coupled to the lens cover.

In one embodiment, provided is a mobile terminal assembly, comprising: a terminal case; and a mobile terminal detachable from the terminal case, wherein the terminal case comprises a front cover part having a front incision part, wherein the mobile terminal comprises: a display unit covered by the front cover part; a first application including: a first user interface provided through the front incision part when the front cover part is closed; and a second user interface provided through an entire area of the display unit when the front cover part is opened; and a control unit configured to display the first user interface of the first application through the front incision part when the front cover part is closed, and configured to display the second user interface of the first application through the entire area of the display unit when the front cover part is opened.

The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a mobile device according to an embodiment of the present invention.

FIG. **2** is a perspective view illustrating a mobile terminal case according to an embodiment of the present invention.

FIG. **3** is a perspective view when a mobile terminal is coupled with a terminal case according to an embodiment of the present invention.

FIG. **4** is a perspective view when a terminal coupling part is seen from the front.

FIG. **5** is a perspective view when a terminal coupling part is seen from the front.

FIG. **6** is a sectional view taken along a line B-B of FIG. **4**.

FIG. **7** is a perspective view of a lens cover.

FIG. **8** is a side view of a lens cover.

FIGS. **9** and **10** are views taken along a line A-A of FIG. **3**. FIG. **9** is a view when a lens cover is closed and FIG. **10** is a view when a lens cover is opened.

FIG. **11** is a flowchart illustrating an operating method of a mobile terminal according to an embodiment of the present invention.

FIG. **12** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit on and exceptional state.

FIG. **13** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit on and exceptional state.

FIG. **14** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit off and screen lock setting state.

FIG. **15** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit off and screen lock unsetting state.

FIG. **16** is a view illustrating an image displayed on a display unit when an opened lens cover is closed in a display unit on and normal state.

FIG. **17** is a view illustrating an image displayed on a display unit when an opened lens cover is closed in a display unit off state.

FIG. **18** is a view illustrating an image displayed on a display unit when a lens cover is opened and a screen lock state is released in a display unit on and exceptional state and then a capture mode is entered and the lens cover is closed again.

FIG. **19** is a view illustrating an image displayed on a display unit when a lens cover is opened and a screen lock state is released in a display unit on and normal state and then a capture mode is entered and the lens cover is closed again.

FIG. **20** is a view illustrating an image displayed on a display unit when a lens cover is opened and a capture mode is entered in a display unit off state and then the lens cover is closed again.

FIG. **21** is a view illustrating an image displayed on a display unit when a camera application is executed but a lens cover is closed.

FIG. **22** is a view illustrating a mobile terminal according to another embodiment of the present invention.

FIG. **23** is a perspective view when a terminal case includes a coupling detection magnet and a mobile terminal includes a case coupling sensing unit for sensing the approach of the coupling detection magnet.

FIG. **24** is a flowchart illustrating a control method of displaying low battery when a lens cover is opened.

FIG. **25** is a flowchart illustrating a control method of executing a block box mode when a lens cover is opened.

FIG. **26** is an exploded perspective view illustrating a terminal cover and a mobile terminal according to a second embodiment of the present invention.

FIG. **27** is a perspective view of a button part.

FIGS. **28**A and **28**B are views illustrating a relationship between a button part and a case coupling sensing unit. FIG. **28**A is a view when a case coupling sensing unit detects the N pole of a button part and FIG. **28**B is a view when a case coupling sensing unit detects the S pole of a button part.

FIG. **29** is a flowchart illustrating a method of setting a flash mode of a camera application when a lens cover is opened.

FIG. **30** is a flowchart illustrating a method of executing at least one mode among a normal capture mode and an augmented reality mode when a lens cover is opened.

FIG. **31** is a flowchart illustrating a method of executing at least one mode among a normal capture mode and a capturing region marking mode when a lens cover is opened.

FIG. **32** is a flowchart illustrating a method of executing at least one mode among a normal capture mode and a camera lock mode when a lens cover is opened.

FIG. **33** is a flowchart illustrating a method of executing at least one mode among a normal capture mode and a capture mode for reflecting a preset photo effect when a lens cover is opened.

FIG. **34** is a view illustrating a terminal case according to a third embodiment of the present invention.

FIG. **35** is a perspective view when a mobile terminal is coupled with a terminal case of FIG. **34**.

FIG. **36** is a sectional view taken along a line C-C of FIG. **35**.

FIG. **37** is a view illustrating a first display area and a second display area of a mobile terminal.

FIG. **38** is a view illustrating the changeable position and size of a first display area.

FIG. **39** is a view when a control unit selectively turns on/off a light source of a backlight unit of a display unit according to a user interface mode of a mobile terminal.

FIG. **40** is a flowchart illustrating a control method of a mobile terminal.

FIG. **41** is a view when a camera application is displayed on a display unit of a mobile terminal.

FIG. **42** is a view illustrating a lock screen in a first user interface mode and a second user interface mode.

FIG. **43** is a view illustrating another example of a user interface.

FIG. **44** is a flowchart illustrating operations of a mobile terminal when an event that needs to be notified to a user occurs with a closed front cover part of a mobile terminal case in the mobile terminal.

FIG. **45** is a view illustrating an operation of a call application in a user interface.

FIG. **46** is a view illustrating a user interface displayed when a user long-presses a power button as a front cover part of a mobile terminal case in a mobile terminal is closed.

FIG. **47** is a view illustrating a user interface displayed when a user provides a volume button input as a front cover part of a mobile terminal case is closed.

FIG. **48** is a view illustrating a terminal case according to another embodiment of the present invention.

FIG. **49** is a view illustrating a terminal case according to another embodiment of the present invention.

FIG. **50** is a perspective view when a stylus pen and a mobile terminal are coupled with a mobile terminal case of FIG. **49**.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Hereinafter, a mobile terminal relating to the present invention is described in more detail with reference to the drawings. The suffixes "module" and "unit" for components used in the description below are assigned or mixed in consideration of easiness in writing the specification and, do not have distinctive meanings or roles by themselves. In the following description, detailed descriptions of well-known functions or constructions will be omitted since they would obscure the invention in unnecessary detail. Additionally, the accompanying drawings are provided to make embodiments of the present invention clear and the technical ideal of the present invention is not limited to the accompanying drawings. It should be understood that the idea and technical scope of the present invention includes all modifications, equivalents and substitutes.

Although terms like first and second may be used to describe various components, the components are not limited to the terms. These terms are used only to distinguish one component from other components.

In this disclosure below, when one part (or element, device, etc.) is referred to as being 'connected' to another part (or element, device, etc.), it should be understood that the former can be 'directly connected' to the latter, or 'electrically connected' to the latter via an intervening part (or element, device, etc.). It will be further understood that when one component is referred to as being 'directly connected' or 'directly linked' to another component, it means that no intervening component is present.

The terms of a singular form may include plural forms unless they have a clearly different meaning in the context.

The meaning of "include," "comprise," "including," or "comprising," specifies a property, a region, a fixed number, a step, a process, an element and/or a component but does not exclude other properties, regions, fixed numbers, steps, processes, elements and/or components.

A mobile terminal described in this specification may include a mobile phone, a smart phone, a laptop computer, a digital broadcasting terminal, a person digital assistant (PDA), a portable multimedia player (PMP), and a navigation. However, it is apparent to those skilled in the art that a configuration listed in an embodiment of the present invention is applied to a stationary terminal such as a digital TV and a desktop computer except when only applicable to a mobile terminal.

FIG. **1** is a block diagram of a mobile device according to an embodiment of the present invention.

A mobile terminal in the embodiments described below may include some or all of components described with reference to FIG. **1**.

The mobile terminal **100** includes a wireless communication unit **110**, an Audio/Video (A/V) input unit **120**, a user input unit **130**, a sensing unit **140**, an output unit **150**, a memory **160**, an interface unit **170**, a control unit **180**, and a power supply unit **190**. Since the components shown in FIG. **1** are not essential, the mobile terminal device **100** including more or less components may be realized.

Below, the components are described one by one.

The wireless communication unit **110** may include at least one module allowing wireless communication between the mobile terminal **100** and a wireless communication system or between the mobile terminal **100** and a network including the mobile terminal **100**. For example, the wireless communication unit **110** may include a broadcast receiving module **111**, a mobile communication module **112**, a wireless internet module **113**, a short-range communication module **114**, and a position information module **115**.

The broadcast receiving module **111** receives a broadcast signal and/or broadcast related information from an external broadcast management server through a broadcast channel.

The broadcast channel may include a satellite channel and a terrestrial channel. The broadcast management server may mean a server generating and transmitting a broadcast signal and/or broadcast related information or a server receiving and transmitting a pre-generated broadcast signal and/or broadcast related information. The broadcast signal may include a TV broadcast signal, a radio broadcast signal, and a data broadcast signal, and also may include a broadcast signal combining a TV broadcast signal or a radio broadcast signal with a data broadcast signal.

The broadcast related information may mean information relating to a broadcast channel, a broadcast program, or a broadcast service provider. The broadcast related information may be provided through a mobile communication network. In this case, the broadcast related information may be received by the mobile communication module **112**.

The broadcast related information may exist in various forms. For example, the broadcast related information may exist in forms such as Electronic Program Guide (EPG) of Digital Multimedia Broadcasting (DMB) or Electronic Service Guide (ESG) of Digital Video Broadcast-Handheld (DVB-H).

The broadcast receiving module **111** may receive a digital broadcast signal by using a digital broadcast system such as Digital Multimedia Broadcasting-Terrestrial (DMB-T), Digital Multimedia Broadcasting-Satellite (DMB-S), Media Forward Link Only (MediaFLO), Digital Video Broadcast-Handheld (DVB-H), or Integrated Services Digital Broadcast-Terrestrial (ISDB-T). Of course, the broadcast receiving module **111** may be configured to be proper for another broadcast system in addition to the digital broadcast system.

The broadcast signal and/or broadcast related information received through the broadcast receiving module **111** may be stored in the memory **160**.

The mobile communication module **112** transmits/receives a wireless signal to/from at least one of a base station, an external terminal, and a server on a mobile communication network. The wireless signal may include various forms of data according to a voice call signal, a video call signal, or text/multimedia message transmission.

The wireless internet module **113** is a module for wireless internet access, and may be internally or externally included in the mobile device **100**. As wireless internet technology, there are Wireless LAN (WLAN) (Wi-Fi), Wireless broadband (Wibro), World Interoperability for Microwave Access (Wimax), and High Speed Downlink Packet Access (HSDPA).

The short-range communication module **114** refers to a module for short-range communication. As short range communication technology, there are Bluetooth, Radio Frequency Identification (RFID), infrared Data Association (IrDA), Ultra Wideband (UWB), and ZigBee.

The position information module **115** is a module for obtaining the position of a mobile terminal, and its representative example includes a Global Position System (GPS) module.

The A/V input unit **120** is to input an audio signal or a video signal, and may include a camera module **121** and a microphone **122**. The camera module **121** processes a video frame such as a still image or a moving image obtained by an image sensor in a video call mode or a capture mode. The processed video frame may be displayed on a display unit **151**.

The video frame processed by the camera module **121** may be stored in the memory **160** or may be transmitted to the outside through the wireless communication unit **110**. The camera module **121** may be provided two according to a usage environment.

The microphone **122** receives an external sound signal through a microphone in a call mode, a recoding mode, or a voice recognition mode and processes it as voice data. In the case of a call mode, the processed voice data may be converted into a format that can be sent to a mobile communication base station and then outputted through the mobile communication module **112**. The microphone **122** may have various noise reduction algorithms to remove noise occurring while an external sound signal is inputted.

The user input unit **130** generates input data to allow a user to control an operation of a terminal. The user input unit **130** may include a key pad, a dome switch, a touch pad (resistive/capacitive), a jog wheel, and a jog switch. Additionally, the user input unit **130** may include a touch input unit **131** equipped at the front of the display unit **151**.

The sensing unit **140** detects a current state of the mobile terminal **100**, for example, a position of the mobile terminal **100**, user contact, an orientation of the mobile terminal **100**, and an acceleration/deceleration of the mobile terminal **100**, and then generates a sensing signal to control an operation of the mobile terminal **100**.

The sensing unit **140** may include a lens cover sensing unit **141** for sensing the open/closed state of the lens cover **240** and also may include a case coupling sensing unit **142** for sensing whether the mobile terminal **100** is coupled with the terminal case **200**. Additionally, the sensing unit **140** may include a front cover sensing unit **143** for sensing whether the front cover part **210** covers the front of the mobile terminal **100**.

Moreover, the sensing unit **140** may include a proximity sensor. An example of the proximity sensor includes a hall sensor. For example, the lens cover sensing unit **141** may be a proximity sensor sensing whether the lens cover **240** is opened or closed by sensing the approach of the lens cover magnet **245** equipped at the lens cover **240**. Moreover, the case coupling sensing unit **142** may be a proximity sensor sensing whether the mobile terminal **100** is coupled with the case **200** by sensing the approach of the lens cover magnet **245** equipped at the lens cover **100**. Additionally, the front cover sensing unit **143** may also include a proximity sensor and for example, may sense the approach of the magnet **222** equipped at the front cover part **210** as shown in FIG. **34**.

Furthermore, the proximity sensor may include optical proximity sensors, capacitive proximity sensors, optical proximity sensor, eddy current proximity sensor, ultrasonic proximity sensors, inductive proximity sensors in addition to a magnetic proximity sensor such as a hall sensor.

Additionally, the sensing unit **140** may sense the on/off state of the display unit **151**, the power supply of the power supply unit **190**, and external device connection of the interface unit **170**.

The output unit **150** generates a visual, auditory, and tactile related output and may include a display unit **151**, a sound output module **152**, an alarming unit **153**, and a haptic module **154**.

The display unit **151** displays (outputs) information processed in the mobile terminal **100**. For example, when a mobile terminal is in a call mode, a call related User Interface (UI) or Graphic User Interface (GUI) is displayed. When the mobile terminal **100** is in a video call mode, or a capture mode, a captured or/and received image, UI, or GUI is displayed.

The display unit **151** may include at least one of a liquid crystal display (LCD), a thin film transistor-liquid crystal display (a TFT LCD), an organic light-emitting diode (OLED), a flexible display, and a 3D display.

Among them, some displays may be a transparent or light transmissive type so that it is possible to see the outside through them. This may be called a transparent display, and its representative example includes a Transparent OLED (TOLED). The display unit **151** may have a rear structure or a light transmissive type structure. Due to such a structure, a user may see an object at the rear of the terminal body through an area that the display unit **151** of the terminal body occupies.

According to an implementation form of the mobile terminal **100**, at least two display units **151** may exist. For example, a plurality of display units are separately or integrally disposed at one side or different sides, respectively, in the mobile terminal **100**.

When the display unit **151** and a sensor sensing a touch operation (hereinafter, referred to as a 'touch sensor') constitute a mutual layer structure (hereinafter, referred to as a 'touch screen'), the display unit **151** may be used as an input device addition to an output device. The touch sensor may have a form such as a touch film, a touch sheet, or a touch pad.

The touch sensor is configured to covert a pressure applied to a specific portion of the display unit **151**, or a change in capacitance occurring at a specific portion of the display unit **151** into an electrical input signal. The touch sensor may be configured to sense a pressure at the time of touch in addition to a touched position and area.

When there is touch input on the touch sensor, signal(s) corresponding thereto may be sent to a touch control unit. The touch control unit processes the signal(s) and transmits corresponding data to the control unit **180**. By doing so, the control unit **180** recognizes which area of the display unit **151** is touched.

The sound output module **152** may output audio data received from the wireless communication unit **110** or stored in the memory **160**, in a call signal receiving mode, a call mode, a recording mode, a recording mode, a voice recognition mode, or a broadcast receiving mode. The sound output module **152** may output a sound signal relating to a function of the mobile terminal **100** (for example, call signal receiving sound, and message receiving sound). The sound output module **152** may include a receiver, a speaker, and a buzzer.

The alarming unit **153** outputs a signal for notifying an event occurrence of the mobile terminal **153**. An example of an event occurring in a mobile terminal may include call signal reception, message reception, key signal input, and touch input. The alarming unit **153** may output a signal for notifying event occurrence with vibration, besides a video signal or an audio signal. The video signal or audio signal may be outputted through the display unit **151** or the sound output module **152**, so that they **151** and **152** may be classified as part of the alarming unit **153**.

The haptic module **154** may generate various tactile effects that a user can feel. A typical example of a haptic effect that the haptic module **154** generates includes vibration. The intensity and pattern of a vibration generated by the haptic module **154** is controllable. For example, different vibrations may be synthesized and outputted or may be sequentially outputted.

The haptic module **154** may generate various haptic effects, for example, a pin arrangement that vertically moves with respect to a contact skin surface, an injection power or suction power of air through a nozzle or an inlet, a graze on a skin surface, a contact of an electrode, an effect by stimuli such as electrostatic force, and an effect by cold/warm reproduction using a heat absorbing or generating device.

The haptic module **154** may deliver haptic effects through direct contact, and a user may feel haptic effects through a muscle sense of fingers or hands. The haptic module **154** may be provided two according to a configuration aspect.

The memory **160** may store a program for an operation of the control unit **180**, and may temporarily store input/output data (for example, a phonebook, a message, a still image, and a moving image). The memory **160** may store data relating to various patterns of vibrations and sounds, which are outputted during touch input on the touch screen.

The memory **160** may include at least one type of storage medium among a flash memory type, a hard disk type, a multimedia card micro type, card type memory (for example, SD or XD memory), Random Access Memory (RAM), Static Random Access Memory (SRAM), Read-Only Memory (ROM), Electrically Erasable Programmable Read-Only Memory (EEPROM), Programmable Read-Only Memory (PROM), magnetic memory, magnetic disk, and optical disk. The mobile terminal **100** may operate in relation to a web storage performing the storage function of the memory **160** on internet.

The interface unit **170** serves as a path through which all external devices are connected to the mobile terminal **100**. The interface unit **170** receives data from an external device or power, and then delivers it to each component in the mobile terminal **100** or transmits data in the mobile terminal **100** to an external device after power is received. For example, the interface unit **170** includes a wired/wireless headset port, an external charging port, a wired/wireless data port, a memory card port, a port connecting a device equipped with an identification module, an audio input/output (I/O) port, a video input/output (I/O) port, and an earphone port.

The identification module is a chip storing various information to authenticate the permission of the mobile terminal **100**, and may include a User Identify Module (UIM), a Subscriber Identity Module (SIM), and a Universal Subscriber Identity Module (USIM). A device equipped with an identification module (hereinafter, referred to as an "identification device") may be manufactured with a smart card type. Accordingly, the identification device may be connected to the mobile terminal **100** through a port.

When the mobile terminal **100** is connected to an external cradle, the interface unit **170** may be a path through which power is supplied from the cradle to the mobile terminal **100**, or various command signals inputted from the cradle are delivered to the mobile terminal **100**. Various command signals or power inputted from the cradle may operate as a signal for recognizing that the mobile terminal **100** is accurately mounted on the cradle.

The control unit **180** controls overall operations of a mobile terminal in general. For example, control and processing relating to a voice call, a data call, a video call are performed. The control unit **180** may include a multimedia module **181** for multimedia playback. The multimedia module **181** may be implemented in the control unit **180** or may be separated from the control unit **180**.

Additionally, the control unit **180** may perform pattern recognition processing to recognize writing input and drawing input on the touch screen as text and images, respectively.

The power supply unit **190** supplies power necessary for operations of each component by receiving external power and internal power in response to a control of the control unit **180**.

Various embodiments described herein may be realized in a computer or device similar thereto readable recording medium by using software, hardware, or a combination thereof. In terms of hardware realization, the embodiments described herein may be realized by using at least one of application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), processors, controllers, micro-controllers, microprocessors, and electrical units for performing other functions. In some cases, embodiments described in this specification may be realized by the control unit **180** itself.

In terms of software realization, embodiments such as procedures and functions described in this specification may be realized using additional software modules. Each of the software modules may perform at least one function and operation described in this specification. Software code may be realized by software application written in a proper program language. The software code is stored in the memory **160** and is executed by the control unit **180**.

First Embodiment

A mobile terminal assembly according to the first embodiment of the present invention includes a mobile terminal **100** and a separate terminal case **200** detachable from the mobile terminal **100**.

Hereinafter, a structure of a terminal case according to a first embodiment of the present invention will be described with reference to FIGS. **2** to **8**.

FIG. **2** is a perspective view when a mobile terminal **100** is coupled with a terminal case **200** according to an embodiment of the present invention.

Referring to FIG. **2**, the terminal case **200** includes a terminal coupling part **210**, a front cover part **220** foldably

coupled to the terminal coupling part **100**, and a connection part **290** connecting the terminal coupling part **100** and the front cover part **220**.

The terminal coupling part **210** covers a portion of a side and a bottom of the mobile terminal **100** and is formed to be detachable from the mobile terminal **100**.

Additionally, the front cover part **220** has a pin form corresponding to a front form of the mobile terminal **100** substantially and a portion of the front cover part **220** may include a transparent front incision part **221**. The front incision part **221** may be formed when a portion of the front cover part **220** is penetrated and may be a portion formed of a transparent member for allowing a touch input of a user.

Hereinafter, a configuration and functions of the terminal coupling part **210** are described in more detail.

FIG. **3** is a perspective view illustrating a mobile terminal coupled with the terminal coupling part **210** as seen diagonally from the rear. FIGS. **4** and **5** are perspective view illustrating the terminal coupling part **210** as seen diagonally from the front. Especially, FIG. **4** illustrates a view when the lens cover **240** is closed and FIG. **5** illustrates a view when the lens cover **240** is opened.

The terminal coupling part **210** has a form in which a central part extends flat substantially and bends toward the front around the left and right end parts and protrudes. Additionally, the front has an open form to allow the mobile terminal **100** to be detachable. Accordingly, a space for receiving the mobile terminal **100** is formed in the terminal coupling part **210** and when the mobile terminal **100** is coupled, covers a side and a bottom of the mobile terminal **100**. Moreover, the distance between the left and right end parts at the frontline of the terminal coupling part **210** is formed to be narrower than the horizontal width of the mobile terminal **100**. Accordingly, when the mobile terminal **100** is coupled, the left and right end parts are elastically deformed and opened. After the mobile terminal is coupled, the left and right end parts of the mobile terminal **100** are pressed inwardly by elastic restoring force. Therefore, a coupling state between the mobile terminal **100** and the terminal coupling part **210** may be maintained.

Here, the terminal coupling part **210** may be additionally coupled with a rear case of the mobile terminal **100** or the rear of a battery cover.

However, unlike this, the terminal coupling part **210** may replace the rear case or the battery cover of the mobile terminal **100**. In this case, the terminal coupling part **210** may cover the rear of electronic components configuring the mobile terminal **100**.

Moreover, the terminal coupling part **210** includes a lens cover mounting part **230**. The lens cover mounting part **230** is disposed at a predetermined position of the terminal coupling part **210** and the lens cover **240** is slidably coupled to the lens cover mounting part **230**. Hereafter, a configuration of the lens cover **240** is described with reference to FIGS. **6** to **8** and then a configuration of the lens cover mounting part **230** is described with reference to FIGS. **3** to **5**.

FIG. **6** is a sectional view taken along a line B-B of FIG. **4**. FIG. **7** is a perspective view of the lens cover **240**. FIG. **8** is a side view of the lens cover **240**.

Referring to FIGS. **6** to **8**, the lens cover **240** includes an inner part **241** disposed inside the terminal coupling unit **210** and an outer part **243** disposed outside the case body **220**. Additionally, the lens cover **240** further includes a middle part **242** disposed between the outer part **243** and the inner part **241**. The inner part **241** and the outer part **243** may all have a plate shape.

The outer part **243** may extend shorter than the inner part **241** along a sliding direction. Additionally, the middle part **242** may extend shorter than the inner part **241**.

Here, a direction in which the lens cover **240** slides is referred to as a first direction (an x-axis direction) and a direction perpendicular to the first direction is referred to as a second direction (a y-axis direction). Accordingly, the first direction and the second direction all are directions parallel to an extension direction of a flat plate forming the inner part **241** or the outer part **243**. Moreover, a direction perpendicular to all the first direction and the second direction is referred to as a third direction (a z-axis direction). The third direction (the z-axis direction) is a direction perpendicular to a flat plate forming the inner part **241** or the outer part **243**. Hereinafter, in describing an embodiment of the present invention, a forward-backward direction means the third direction.

Accordingly, in relation to the length of the first direction (the x-axis direction) of the lens cover **240**, the inner part **241** is the longest, the outer part **243** is the second longest, and the middle part **242** is the shortest.

Moreover, in relation to the length of the second direction (the y-axis direction) of the lens cover **240**, the inner part **241** and the outer part **243** are almost same and the middle part **242** is the shortest. That is, the second direction length of the middle part **242** has a form extending relatively shorter than the inner part **241** and the outer part **243**. Accordingly, the lens cover **240** has a form in which the middle part **242** between the inner part **241** and the outer part **243** is concavely and inwardly recessed along the second direction. Then, this concave groove forms a guide groove **244**.

Moreover, an elastic protrusion **246** protruding in the second direction is coupled with the inner part **241**. The elastic protrusion **246** is elastically deformable. Accordingly, if there is no external force, the elastic protrusion **246** protrudes toward the outside but if an external force is applied in the second direction, retreats toward the inside.

Moreover, the lens cover magnet **245** is coupled with the lens cover **240**. The lens cover magnet **245** is coupled with the first direction end part of the inner part **241**. The approach of the lens cover magnet **245** is sensed by the lens cover sensing unit **141** (described below) built in the mobile terminal **100** and this may serve to allow the control unit **180** to recognize an open/closed state of the lens cover **240**. For reference, the lens cover sensing unit **141** may be a hall sensor for sensing magnetic field of the lens cover magnet **245**.

Moreover, the outer edge of the outer part **243** is formed to be inclined. In more detail, the outer part **243** has a form in which the outers of the both end parts in the first sliding direction are inclined. With such a structure, when the camera module **121** operates, it prevents the angle of view from being narrowed due to the outer part **243**. That is, the maximum angle of view may be secured.

Hereinafter, a configuration of a mounting part of the lens cover **230** with which the lens cover **240** having the above configuration is slidably coupled is described.

Referring to FIGS. **4** and **5**, the lens cover mounting part **230** is formed when the inner side of the terminal coupling part **210** is steppedly and outwardly recessed. That is, the inner side is recessed outwardly along the third direction (the z-axis direction). At this point, the recessed depth of the lens cover mounting part **230** may be roughly identical to the third direction thickness of the inner part **241** of the lens cover **240** or deeper than the inner part **241**.

A rear incision part **231** extending in the first direction is formed at the lens cover mounting part **230**. The rear incision part **231** penetrates the terminal coupling part **210** in the third

direction and extends in the first direction with a predetermined width in the second direction.

Moreover, the guide protrusion **231** of FIG. **3** inserted into the guide groove **224** of the lens cover **240** is disposed at the lens cover mounting part **230**. The guide protrusion **232**, as a portion inserted into the guide groove **244** of the lens cover **240**, is an edge portion of the rear incision part **241** extending in the first direction. The third direction width of the guide protrusion **232** may be identical to another portion of the terminal coupling part **210**. However, the third direction width of the guide protrusion **232** may be thicker or thinner another portion.

Moreover, protrusion insertion parts **233***a* and **233***b* to which the elastic protrusion **246** is insertable are disposed at the lens cover mounting part **230**. The protrusion insertion parts **233***a* and **233***b* may be formed at the stepped surface **234** of the mounting part of the lens cover **240**. Here, the stepped surface **234**, as a stepped portion between the recessed lens cover mounting part **230** and its outer portion, is a surface facing the second direction (the y-axis direction) roughly. Also, the protrusion insertion parts **233***a* and **233***b* has a form in which a portion of the stepped surface **234** is concavely recessed in the second direction.

The protrusion insertion parts **233***a* and **233***b* are formed in plurality along the first direction. For example, the protrusion insertion parts **233***a* and **233***b* include a first protrusion insertion part **233***a* to which the elastic protrusion **246** is inserted when the lens cover **240** is closed and a second protrusion insertion part **233***b* to which the elastic protrusion **246** is inserted when the lens cover **240** is opened. Accordingly, when the lens cover **240** is opened, the elastic protrusion **246**, which is inserted into the first protrusion insertion part **233***a* when the lens cover **240** is closed, may exit from the first protrusion insertion part **233***a*, slide along the first direction, and be inserted into the second protrusion insertion part **233***b*.

Moreover, while the lens cover **240** slides, as shown in FIG. **6**, the sliding of the lens cover **240** is guided by the guide protrusion **232** inserted into the inside of the guide groove **244**.

Hereinafter, referring to FIGS. **9** and **10**, the configuration of the mobile terminal **100** is described additionally and then a physical operating method of the lens cover **240** is described.

FIGS. **9** and **10** are sectional views taken along a line A-A of FIG. **3** and illustrate the mobile terminal **100** coupled with the terminal case **200**. FIG. **9** illustrates a view when the lens cover **240** is closed and FIG. **10** illustrates a view when the lens cover **240** is opened.

A display unit **151** is disposed in the mobile terminal **100** so as to display an image. Also, a touch input unit **131**, as part of the user input unit **130**, is disposed at the front (the top in FIGS. **9** and **10**). Also, a printed circuit board **181** coupled with the control unit **180** is disposed at the rear of the display unit **151**.

Additionally, the camera module **121** is disposed at the central portion of the printed circuit board **181** and the lens cover sensing unit **141** for sensing the opened or closed state of the lens cover **240** is disposed at a portion spaced a predetermined distance from the camera module **121** in a horizontal direction, that is, the first direction. The lens cover sensing unit **141** may be a hall sensor for sensing whether the lens cover magnet **245** coupled with the lens cover **240** approaches.

In relation to the terminal case **200** and the mobile terminal **100**, as shown in FIG. **9**, when the lens cover **240** is closed, the lens cover magnet **245** coupled with the lens cover **240** is disposed in the sensing area of the lens cover sensing unit **141**. Since the lens cover sensing unit **141** is a hall sensor, it detects whether the lens cover **240** is opened or closed by detecting magnetic field of the lens cover magnet **245**. That is, when the lens cover magnet **245** is placed within a predetermined distance from the lens cover sensing unit **241**, the lens cover sensing unit **141** senses it and thus recognizes that the lens cover **240** is closed.

On the other hand, as shown in FIG. **10**, when the lens cover **240** is opened and becomes away from the lens cover sensing unit **141**, that is, outside the sensing area of the lens cover sensing unit **141**, the lens cover sensing unit **141** senses that the lens cover **240** is opened.

Moreover, when the lens cover **240** slides in the lens cover mounting part **230**, the guide protrusion **232**, as shown in FIG. **6**, is maintained being inserted into the guide groove **244**. That is, the sliding of the lens cover **240** may be guided by the guide protrusion **232** and the guide groove **244**.

Hereinafter, referring to FIG. **11**, an operating method of the mobile terminal according to an embodiment of the present invention is described in more detail. In more detail, an operating method of the control unit **180** is described according to whether the lens cover **240** is opened or closed.

FIG. **11** is a flowchart illustrating an operation of a mobile terminal according to an embodiment of the present invention.

Before describing each operation shown in FIG. **11**, when an overall operation method is described in brief, as a user slides the lens cover **240** and changes the closed state into an opened state, the camera lens **121***a* is exposed to the outside. At this point, the sensing unit **140** senses the opening of the lens cover **240**. The control unit **180** executes a camera application when it is determined that the lens cover **240** is opened. At this point, an operation of the camera application may start in one of a capture mode and a camera preview mode. Accordingly, the control unit **180** may display a camera preview mode interface on the display unit **151** by selecting the camera preview mode and may display a capture mode user interface on the display unit **151** by selecting a capture mode. For reference, the capture mode means a mode in which capturing is available by a user input and the camera preview mode means a mode in which capturing by a user input is limited.

Hereinafter, referring to FIG. **11**, an operation for executing a camera application in one of a capture mode or a camera preview mode is described in more detail.

First, the control unit **180** receives signals on the open of the lens cover **240** from the sensing unit **240** in operation S**201**.

When an opened state of the lens cover **240** is received, the control unit **180** determines whether the current display unit **151** is on or off in operation in operation S**202**.

When the display unit **151** is on, the control unit **180** determines whether it is an exceptional state in operation S**203**. The exceptional state is a lock screen state or an in call state and is set as a state in which free use of a mobile terminal is limited or a prioritized task is performed. The concept contrary to the exceptional state is a normal state. The normal state is set to a state other than the exceptional state. Accordingly, in the normal state, a mobile terminal may be used freely through a touch operation. Accordingly, when the display unit **151** is on, it is in one of the normal state and the exceptional state.

The control unit **180** enters the camera preview mode when a state of the display unit **151** is in the exceptional state in operation S**204**. That is, by selecting the camera preview mode, the camera application is executed in the camera preview mode. Accordingly, a camera preview mode interface is displayed on the display unit **151**. The camera preview mode

interface includes a capture mode interface **301** and a lock release interface **302**. Accordingly, in the camera preview mode, the capture mode interface is outputted but if a lock state is released by manipulating the lock release interface outputted together or a prioritized task such as a call state is not released, a touch input for capture is not received.

In this state, a user may perform a touch input for lock release to release a screen lock state.

The control unit **180** determines whether the screen lock state is released in the camera preview mode in operation S**205**.

Then, when control unit **180** receives a screen lock release signal as a determination result from a touch unit, after the lock state is released, it enters the capture mode in operation S**206**. That is, the capture mode is selected. At this point, the control unit **180** displays the capture mode interface **301** of the camera application on the display unit **151**. Accordingly, a user may capture a desired subject by using the camera application.

Moreover, in operation S**203**, after the control unit **180** determines whether the display unit **151** is in the exceptional state, if the display unit **151** is in the normal state instead of the exceptional state, the control unit **180** enters the capture mode directly. That is, the control unit **180** selects the capture mode and displays the capture mode interface **301** on the display unit **151**. Accordingly, a user manipulates the capture mode interface **301** to capture an image.

Moreover, after determining that the display unit **151** is off in operation S**202**, the control unit **180** determines whether the display unit **151** is in a screen lock setting state in operation S**208**.

If it is determined that the display unit **151** is in the screen lock setting state, the control unit **180** enters the camera preview mode in operation S**209**. That is, by selecting the camera preview mode, the camera application is executed in the camera preview mode. Accordingly, the display unit **151** displays the lock release interface **302** in addition to the capture mode interface **301**. That is, in the camera preview mode, although the capture mode interface **301** is outputted, if a lock state or a prioritized task state is not released by manipulating the lock release interface **302** outputted together, capturing an image is not performed.

In this state, a user may perform a touch input for lock release to release a screen lock state.

The control unit **180** determines whether the screen lock state is released in the camera preview mode in operation S**210**. Then, when a control unit **180** receives a screen lock release signal as a determination result from a touch unit, after the lock state is released, it enters the capture mode in operation S**211**. That is, the capture mode is selected. In the capture mode, the control unit **180** outputs the capture mode interface **301** of the camera application on the display unit **151**. Accordingly, a user may capture a desired subject by using the camera application.

Moreover, in operation S**208**, if it is determined that the display unit **151** is not in the screen lock state, the control unit **180** enters the capture mode in operation S**212**. That is, the capture mode is selected. Then, the control unit **180** outputs the capture mode interface **301** of the camera application on the display unit **151**. Accordingly, a user may capture a desired subject by using the camera application.

FIGS. **12** to **15** are views illustrating a user interface provided in the above-mentioned process.

First, FIG. **12** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit on and exceptional state. In more detail, as operation S**204** is performed in the display unit on and exceptional state, a camera preview mode interface is outputted on the display unit **151**. As described above, as the camera application is executed, the capture mode interface **301** and the lock release interface **302** are displayed on the display unit **151**. Although FIG. **12** illustrates an exemplary screen for inputting a 4-digit password as one example of various scenarios for lock release, other various lock release scenarios may be provided.

Moreover, FIG. **13** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit on and exceptional state. In more detail, as operation S**207** is performed in the display unit on and normal state, a capture mode interface is provided. In this state, a user may perform capturing an image by short-touching or long-touching a capture icon.

Moreover, FIG. **14** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit off and screen lock setting state. In more detail, while the display unit **151** is off and a screen lock is set, as operation S**209** is performed with the lens cover **240** opened, the control unit **180** displays the display screen of the display unit **151** in the camera preview mode. That is, the screen of the display unit **151** in operation S**209** is shown. In this state, the display unit **151** executes the camera application so that it outputs the capture mode interface **301** and the lock release interface **302** on the display unit **151**. At this point, as one of various scenarios providing lock release, a lock release method for releasing a lock setting by dragging a pattern may be provided.

As shown in a state of FIG. **14**, when a user performs a touch input for lock release to release a screen lock state, the screen lock state is released and it is possible to enter the capture mode. That is, the capture mode is selected.

Moreover, FIG. **15** is a view illustrating an image displayed on a display unit when a lens cover is opened in a display unit off and screen lock unsetting state. In more detail, in the display unit off and screen lock unsetting state, once an open signal for the lens cover **240** is inputted to the control unit **180**, the control unit **180** executes the capture mode of the camera application to display the capture mode interface **301** on the display unit **151**.

Hereinafter, referring to FIGS. **16** to **20**, in contrast to those described so far, an operating method of a mobile terminal when the lens cover **240** is manipulated from an off state to an on state is described. In more detail, referring to FIGS. **16** and **17**, while the camera application is not in execution, if an opened lens cover is closed, changes in a user interface are described. Referring to FIGS. **18** to **20**, while the camera application is in execution, a display unit is shown when the opened lens cover is closed.

FIGS. **16** and **17** are views illustrating a user interface when the display unit **151** is on but does not enter a capture mode or a camera preview mode. FIGS. **18** and **19** are views illustrating a user interface when a control unit enters a capture mode or a camera preview mode.

Hereinafter, examples of FIGS. **16** to **20** are examined in order.

FIG. **16** is a view illustrating an image displayed on a display unit when an opened lens cover is closed in a display unit on and normal state. Referring to FIG. **16**, when the display unit **151** is on and is not in a capture mode or a camera preview mode, even if the camera lens **121***a* is closed, a user interface does not change. That is, when the display unit **151** is on and is not in a capture mode or a camera preview mode, even if a close signal of the camera lens **121***a* is received, the control unit **180** does not perform an additional task for user interface switching.

As shown in FIG. **17**, this is identical to the case that the display unit **151** is off. FIG. **17** is a view illustrating an image displayed on a display unit when an opened lens cover is closed in a display unit off state. When the display unit **151** is off and the lens cover **240** is closed, the display unit **151** maintains an off state continuously. That is, when the display unit **151** is off and is not in a capture mode or a camera preview mode, even if the camera lens **121***a* is closed, the control unit **180** does not perform an additional task for user interface switching.

Moreover, as shown in FIGS. **18** to **20**, while the control unit **180** provides a user interface of a capture mode or a camera preview mode through the display unit **151**, if the lens cover **240** changes from an on state into an off state, the control unit **180** display a screen before a capture mode or camera preview mode interface is displayed through the display unit **151**.

FIG. **18** is a view illustrating an image displayed on a display unit when a lens cover is opened and a screen lock state is released in a display unit on and exceptional state and then a capture mode is entered and the lens cover is closed again. Referring to FIG. **18**, when a capture mode is entered through operation S**206** of FIG. **10** described above by releasing a screen lock in operation S**204**, as a closed signal of the lens cover **240** is received, the control unit **180** terminates a camera preview mode and displays an image before switching into the camera preview mode. That is, an image guiding a screen lock state is outputted. However, in the case of swipe, a lock release screen is displayed in addition to a lock released screen.

FIG. **19** is a view illustrating an image displayed on a display unit when a lens cover is opened and a screen lock state is released in a display unit on and normal state and then a capture mode is entered and the lens cover is closed again. Referring to FIG. **18**, when a capture mode is entered through operation S**207** of FIG. **8** described above, as a closed signal of the lens cover **240** is received, the control unit **180** terminates a capture mode and displays an image before switching into the capture mode.

FIG. **20** is a view illustrating an image displayed on a display unit when a lens cover is opened and a capture mode is entered in a display unit off state and then the lens cover is closed again. Referring to FIG. **20**, when a camera preview mode or a capture mode is outputted on the display unit **151** through operation S**212** of FIG. **10** described above, as a closed signal of the lens cover **240** is received, the control unit **180** terminates a preview mode or a capture mode and turns off the display unit **151**, thereby returning to an original off state of the display unit **151**.

Moreover, FIG. **21** is a view illustrating a user interface when the lens cover **240** is maintained in a closed state and capturing is impossible although a camera application is executed through an operation of a mobile terminal. In such a case, the control unit **180** may output a guide message "lens cover is closed" or "open lens cover" through a display unit.

In this state, when lens cover **240** is opened by an operation of a user, the control unit **180** may output an image displaying this, for example, an animation representing that the camera's shutter is opened.

Moreover, when the lens cover is opened in operation S**207** or S**212**, the control unit **180**, the control unit **180** is set to capture an image so that fast capturing is possible. At this point, capturing is made when the lens cover is opened or after a time delay of a predetermined time. For example, first capturing may be set to be performed after 1 sec when the lens cover is opened.

Moreover, the lens cover **240** according to an embodiment of the present invention may be configured to horizontally slide along the first direction as described with reference to FIG. **3** to **21** or may be configured to vertically slide along the second direction as shown in FIG. **22**. Even if the lens cover **240** is opened or closed vertically, an operation of a mobile terminal according to the opened or closed state of the lens cover **240** should be understood as being identical to an operation when the lens cover **240** moves horizontally.

Moreover, as shown in FIG. **23**, the terminal case **200** includes a coupling detection magnet **250** and the mobile terminal **100** includes a case coupling sensing unit **142** for sensing whether the terminal case **200** is coupled by sensing the approach of the coupling detection magnet **250**.

That is, the mobile terminal **100**, as described with reference to the block diagram of FIG. **1**, may include the lens cover sensing unit **141** and the case coupling sensing unit **142**. The terminal coupling unit **210** of the terminal case **200** includes the lens cover magnet **245** and the coupling detection magnet **250**.

Accordingly, the lens coupling sensing unit **142** in the sensing unit **140** may sense whether the mobile terminal **100** is coupled with the terminal case **200** and the control unit **180** may provide various user interfaces or various applications on the basis of the sensing information.

Hereinafter, referring to FIGS. **24** and **25**, an operating method of the mobile terminal **100** equipped with the coupling detection magnet **250** is described in more detail.

First, when a battery remaining is less than a reference value and the lens cover **240** is opened, low battery information is displayed. This case is described with reference to FIG. **24**. FIG. **24** is a flowchart for illustrating such an example.

Referring to FIG. **24**, the control unit **180** determines whether the mobile terminal **100** is coupled with the case **200** on the basis of the detection information of the case coupling sensing unit **142** in operation S**311**.

Additionally, on the basis of the detection information of the lens cover sensing unit **141**, it is determined whether the lens cover **240** is opened in operation S**312**.

Additionally, on the basis of a signal from the power supply unit **190**, it is determined whether a battery remaining is less than a reference value in operation S**313**.

When a mobile terminal is coupled with a case and a lens cover is opened, if it is determined that a battery remaining is less than a reference value, the control unit **180** displays a message that the battery remaining is low through the display unit **151** in operation S**314**.

At this point, the message that the battery remaining is low is a sentence or a sound signal meaning that the battery remaining is insufficient. Additionally, a battery display may be enlarged and displayed through a display unit. A method of displaying a low battery may be various besides the above method.

Moreover, in the case that a terminal case is mounted at a vehicle, as shown in FIG. **25**, the mobile terminal **100** is mounted at the case **200** and a black box mode is automatically executed if the lens cover **240** is opened. FIG. **25** is a flowchart for illustrating an example of a block box mode in execution.

Referring to FIG. **25**, the control unit **180** determines whether the mobile terminal **100** is coupled with the case **200** attached to a vehicle on the basis of the sensing information of the case coupling sensing unit **142** in operation S**321**.

Then, on the basis of the sensing information of the lens cover sensing unit **141**, it is determined whether the lens cover **240** is opened in operation S**322**.

When it is determined that the mobile terminal **100** is coupled with the case attached to the vehicle and the lens cover **240** is opened, the control unit **180** executes the black box mode in operation S**323**. Here, executing the black box mode may be executing a black box application or a video recording function of a camera application.

Moreover, although the terminal case **200** includes the terminal coupling part **210**, the front cover part **220**, and the connection part **290** according to this embodiment of the present invention, the terminal case **200** may only include the terminal coupling **210** without the front cover part **220** and the connection part **290**.

Second Embodiment

Moreover, a mobile terminal assembly according to the second embodiment of the present invention includes a mobile terminal **100** and a terminal case **200** detachable from the mobile terminal **100**.

FIG. **26** is an exploded perspective view illustrating the terminal case **200** and the mobile terminal **100** detachable from the terminal case **200** according to the second embodiment of the present invention. FIG. **27** is a side view of a button part **260**. FIG. **28** is a view illustrating an operating state of the button part **260**.

Although only the terminal coupling part **210** of the terminal case **200** is shown in FIG. **26**, the terminal case **200** may include the front cover part **220** and the connection part **230** like the first embodiment. Additionally, the terminal case **200** includes only the terminal coupling part **210** without the front cover part **220** and the connection part **230**.

Hereinafter, referring to FIGS. **26** to **33**, the coupling detection magnet **250** equipped at the terminal case **200** includes a plurality of magnetic bodies having different polarities and the case coupling sensing unit **142** built in the mobile terminal **200** senses the polarity of a magnet. A control unit executes a preset application or display a user interface on the basis of the sensing value.

First, referring to FIG. **26**, the terminal case **200** further includes coupling detection magnetic bodies **265**N and **265**S for sensing the coupling of the mobile terminal **100** and the terminal case **200** in addition to the lens cover magnet **245** for sensing the opened or closed state of the lens cover **240**. The coupling detection magnetic bodies **265**N and **265**S are disposed at the button part **260**. The terminal case **200** described with reference to FIG. **26** has the same configuration as that in the first embodiment except for the button part **260** added. Therefore, overlapping description other than the button part **260** is omitted.

Hereinafter, referring to FIG. **27**, a configuration of the button part **260** is described in more detail. FIG. **27** is a side view of the button part **260**.

Referring to FIGS. **27** to **8**, the button part **260** includes an inner part **261** disposed inside the terminal coupling unit **210** and an outer part **263** disposed outside the case body **220**. Additionally, the button part **260** further includes a middle part **262** disposed between the outer part **263** and the inner part **26**. The inner part **261** and the outer part **263** may all have a plate shape.

The outer part **263** may extend shorter than the inner part **261** along the first direction, that is, a sliding direction. Additionally, the middle part **262** may extend shorter than the inner part **241**. The outer part **263** and the middle part **262** are disposed at the first direction center of the inner part **261** extending long.

Moreover, the second direction length of the lens cover **240** is identical to that in the first embodiment of FIG. **6**. That is, the inner part **261** and the outer part **263** have the same second direction length and the middle part **262** is the shorter than those. That is, the second direction length of the middle part **262** is relatively shorter than that of the inner part **261** and the outer part **263**. Accordingly, the lens cover **240** has a form in which the middle part **262** between the inner part **261** and the outer part **263** is concavely and inwardly recessed along the second direction as seen from the first direction, that is, the sliding direction.

Moreover, an elastic protrusion **246** protruding in the second direction is coupled with the inner part **261**. The elastic protrusion **246** is elastically deformable. Accordingly, if there is no external force, the elastic protrusion **246** protrudes toward the outside but if an external force is applied in the second direction, retreats toward the inside.

Moreover, the coupling detection magnetic bodies **265**N and **265**S are coupled with the lens cover **240**. The coupling detection magnetic bodies **265**N and **265**S may include a plurality of magnetic bodies having different polarities. For example, the coupling detection magnetic bodies **265**N and **265**S may include a first polar magnet **265**N having a first polarity and a second polar magnet **265**S having a second polarity. The first polarity may be the N pole and the second polarity may be the S pole.

The magnet **250** is coupled with the vicinity of both end parts of the inner part **261**. That is, the first polar magnet **265**N is coupled with one end of the inner part **261** and the second polar magnet **265**S is coupled with the other end of the inner part **261**.

The approach of the coupling detection magnetic bodies **265**N and **265**S is sensed by the case coupling sensing unit **142** built in the mobile terminal **100** and this may serve to allow the control unit **180** to recognize the opened or closed state of the lens cover **240**.

Moreover, the button part **260** may be coupled with the case body **210** of the terminal case **200**. For this, a structure similar to that of the above-mentioned lens cover mounting part **230** is prepared at the mounting position of the button part **260**. Accordingly, the button part mounting part where the button part **260** is mounted is not described.

Additionally, as mentioned above, the terminal case **200** described with reference to FIG. **26** has the same configuration as that in the first embodiment except for the button part **260** added. Therefore, overlapping description other than the button part **200** is omitted.

Hereinafter, the mobile terminal **100** coupled with the terminal case **200** is described with reference to FIG. **26**. The mobile terminal **100** includes a case coupling sensing unit **142** for sensing the approach of the coupling detection magnet **250** mounted at the button part **260**. Moreover, the case coupling sensing unit **142** may be a hall sensor. The hall sensor may be disposed at a position corresponding to the center of the button part **260**. That is, the hall sensor may be disposed at the first direction center of the mobile terminal **100**.

Hereinafter, referring to FIG. **28**, a positional relationship between the magnetic bodies **265**N and **265**S coupled with the button part **260** and the case coupling sensing unit **142** is described.

FIG. **28**A is a view when the first polar magnet **265**N having the N pole is adjacent to the inside of the detection area of the case coupling sensing unit **142** and FIG. **28**B is a view when the second polar magnet **265**S having the S pole is adjacent to the inside of the detection area of the case coupling sensing unit **142**.

The button part **260** is movable along the first direction. As shown in FIG. **28**A, as the button part **260** moves to the right,

the second polar magnet **265**S becomes away from the case coupling sensing unit and the first polar magnet **265**N becomes closer to the case coupling sensing unit **142**. When the button part **260** slides all the way to the right, the first polar magnet **265**N exists in the detection area of the case coupling sensing unit **142**. The case coupling sensing unit **142** may detect the magnetic field of the first polar magnet **142**. Hereinafter, the position of the button part **260** when the magnetic field of the first polar magnet **142** is sensed by the case coupling sensing unit **142** is called a first position of the button part **260**. The button part **260** may be fixed at the first position by the elastic protrusion **266**. The principle that the position is fixed by the elastic protrusion **266** is identical to that in the sliding and fixing of the lens cover **240** according to the first embodiment of the present invention. Therefore, its overlapping description is omitted.

Moreover, when a user presses the outer part **264** to the left and thus button part **260** slides to the left as shown in FIG. **28**B, the second polar magnet **265**S enters the sensing area of the case coupling sensing unit **142**. At this point, the position of the button part **260** is called a second position. Moreover, the button part **260** may be fixed at the second position by the elastic protrusion **266**. The principle that the position is fixed by the elastic protrusion **266** is identical to that in the above. Therefore, its overlapping description is omitted.

Moreover, according to whether the button part **260** is disposed at the first position or the second position and whether the lens cover **240** is opened or closed, a preset user interface may be displayed on the display unit **151** of the mobile terminal **100** or a preset application may be executed.

That is, the control unit **180** may execute a preset application or display a preset user application on the basis of the sensing information received from the lens cover sensing unit **141** and the position information on the button part **260** received from the case coupling sensing unit **142**.

Hereinafter, various operating methods of the mobile terminal **100** are described on the basis of the open/close information on the lens cover **240** and the position information on the button part **260**.

First, referring to FIG. **29**, an example of setting a flash operating mode when a camera application is in execution is described. FIG. **29** is a flowchart for illustrating such an example.

The control unit **180** determines whether a lens cover is opened on the basis of the sensing information of the lens cover sensing unit **141** in operation S**331**.

Additionally, the control unit **180** determines whether the button part **260** is disposed at the first position or the second position on the basis of the sensing information of the case coupling sensing unit **142** in operation S**332**.

If it is determined that the lens cover is opened and the button part **260** is disposed at the first position, the control unit **180** sets an auto flash mode in operation S**333**. Then, the control unit **180** executes a camera application in the auto flash mode. That is, when entering the capture mode described in the first embodiment, a flash is automatically set to the auto flash mode. For reference, when the flash is in the auto flash mode, if it is determined that there is no sufficient light by sensing the amount of light around, the flash may operate automatically.

However, if it is determined that the lens cover is opened and the button part **260** is disposed at the second position, the control unit **180** sets a manual flash mode in operation S**334**. Then, the control unit **180** executes a camera application in the auto flash mode. That is, when entering the capture mode described in the first embodiment, the flash is set to the manual flash mode. Accordingly, even if there is no sufficient light during capturing, the flash does not operate automatically and is only operated by a user's manipulation.

Moreover, when the lens cover **240** is opened and a camera application is executed, the mobile terminal may operate in an augmented reality mode. That is, according to the position of the button part **260**, when the lens cover **240** is opened, the control unit **180** may execute the camera application in one of a normal capture mode or an augmented reality mode. FIG. **30** is a flowchart for illustrating such an example.

Hereinafter, referring to FIG. **30**, entering an augmented reality mode during the execution of a camera application is described.

First, the control unit **180** determines whether a lens cover is opened on the basis of the sensing information of the lens cover sensing unit **141** in operation S**341**.

Additionally, the control unit **180** determines whether the button part **260** is disposed at the first position or the second position on the basis of the sensing information of the case coupling sensing unit **142** in operation S**342**.

If it is determined that the lens cover is opened and the button part **260** is disposed at the first position, the control unit **180** executes a normal capture mode in operation S**343**. That is, an interface for one of the capture mode and the camera preview mode described in the first embodiment is displayed on the display unit **151**.

If it is determined that the lens cover is opened and the button part **260** is disposed at the second position, the control unit **180** executes a normal capture mode in operation S**344**. For example, when the camera application is executed, information on a background building may be displayed on the display unit **151** by turning on a GPS.

Moreover, when the lens cover **240** is opened, as entering the capture mode, the mobile terminal may be set to execute a capturing region marking mode. FIG. **31** is a flowchart for illustrating such an example.

Hereinafter, referring to FIG. **31**, when the camera application is executed by opening the lens cover, one of the normal capture mode and the photographing display mode is selected. This is described with an example.

First, the control unit **180** determines whether a lens cover is opened on the basis of the sensing information of the lens cover sensing unit **141** in operation S**351**.

Additionally, the control unit **180** determines whether the button part **260** is disposed at the first position or the second position on the basis of the sensing information of the case coupling sensing unit **142** in operation S**352**.

If it is determined that the lens cover is opened and the button part **260** is disposed at the first position, the control unit **180** executes the camera application in the normal capture mode in operation S**353**. At this point, entering the normal capture mode means entering the capture mode described in the first embodiment.

However, if it is determined that the lens cover is opened and the button part **260** is disposed at the second position, the control unit **180** executes the camera application in the capturing region marking mode in operation S**354**.

As entering the capturing region marking mode, the control unit **180** obtains current position information by turning on a GPS and displays this information during photographing. Additionally, the captured picture may be stored together with the position information. That is, location based service may be provided to the captured picture.

Moreover, when the lens cover **240** is opened, the mobile terminal may execute the camera application in the normal capture mode or may enter the camera lock mode to limit the execution of the camera application. FIG. **32** is a flowchart for illustrating such an example.

Hereinafter, referring to FIG. **32**, when the camera application is executed by opening the lens cover, one of the normal capture mode and the camera lock mode is selectively executed. This is described with an example.

First, the control unit **180** determines whether a lens cover is opened on the basis of the sensing information of the lens cover sensing unit **141** in operation S**361**.

Additionally, the control unit **180** determines whether the button part **260** is disposed at the first position or the second position on the basis of the sensing information of the case coupling sensing unit **142** in operation S**362**.

If it is determined that the lens cover is opened and the button part **260** is disposed at the first position, the control unit **180** executes the camera application in the normal capture mode in operation S**363**.

On the other hand, if it is determined that the lens cover is opened and the button part **260** is disposed at the second position, the control unit **180** enters a cameral lock mode in operation S**364**. That is, even when the lens cover **240** is opened, the camera application is not executed. Accordingly, when the mobile terminal is in use, even if a user opens the lens cover **240** by mistake, the execution of the cameral application may be limited.

Moreover, when the lens cover **240** is opened, as entering the capture mode, the mobile terminal may preset a frequently used photo effect and then may automatically execute the preset effect. FIG. **33** is a flowchart for illustrating such an example.

Hereinafter, referring to FIG. **33**, when the camera application is executed by opening the lens cover, one of the normal capture mode and the capture mode reflecting a preset photo effect is selectively executed. This is described with an example.

First, the control unit **180** determines whether a lens cover is opened on the basis of the sensing information of the lens cover sensing unit **141** in operation S**371**.

Additionally, the control unit **180** determines whether the button part **260** is disposed at the first position or the second position on the basis of the sensing information of the case coupling sensing unit **142** in operation S**372**.

If it is determined that the lens cover is opened and the button part **260** is disposed at the first position, the control unit **180** executes the camera application in the normal capture mode in operation S**373**.

However, if it is determined that the lens cover is opened and the button part **260** is disposed at the second position, the control unit **180** selects the capture mode reflecting a preset photo effect and executes the camera application in operation S**374**.

Third Embodiment

Referring to FIGS. **34** and **35**, a mobile terminal assembly according to the third embodiment of the present invention includes a mobile terminal **100** and a separate terminal case **200** detachable from the mobile terminal **100**.

FIG. **34** is a perspective view illustrating the terminal case **200** according to the third embodiment of the present invention. FIG. **35** is a perspective view when the terminal case **200** is coupled with the mobile terminal **100** according to the third embodiment of the present invention.

The terminal case **200** includes a terminal coupling part **210** allowing the mobile terminal **100** to be detachable and a front cover part **220** foldably coupled with the terminal coupling part **210** to cover the front of the mobile terminal **100**. Additionally, the terminal case **200** further comprises a connection part **290** connecting the terminal coupling part **210** and the front cover part **220**.

When each configuration of them is described in more detail, the terminal coupling part **210** may be identical to that in one of the first embodiment and the second embodiment.

The front cover part **220** may be formed of a plate member having a form corresponding to the front of the mobile terminal **100**. The front cover part **220** includes a front incision part **221**. The front incision part **221** is formed by incising a portion of the front cover part **220**. Accordingly, a user may see an image or video displayed on the display unit **151** of the mobile terminal **100** and may perform a touch input through the front incision part **221**.

The front cover magnet **222** may be mounted at the front cover part **220**. When the front cover magnet **222** is mounted at the front cover part **220**, changes in the magnetic field occur as the front cover **220** is opened or closed. This may be detected by the mobile terminal **100**.

Additionally, a surface of the front cover part **220** contacting the front of the mobile terminal **100** may be processed to prevent static electricity thereby preventing an unintended touch input of a user. A static electricity preventing material may be applied or a static electricity preventing film may be attached to the front cover part **220**, so as to prevent static electricity.

Hereinafter, a structure of the mobile terminal **100** according to the third embodiment of the present invention will be described with reference to FIGS. **35** and **36**. The mobile terminal **100** includes a front cover sensing unit **143** for sensing whether the front cover part **220** is opened or closed.

As shown in FIG. **36**, the mobile terminal **100** includes a display panel **151**, a touch input unit **131**, a printed circuit substrate **182**, a front cover sensing unit **143**. Except for the front cover sensing unit **143** added, the mobile terminal **100** shown in FIG. **36** has a structure similar or identical to that of the mobile terminal in the first embodiment. Therefore, their overlapping description is omitted.

Moreover, FIG. **35** is a schematic perspective view of the front cover sensing unit **143**. This is for illustrating a schematic position of the front cover sensing unit **143** in the mobile terminal **100** and the position of the front cover sensing unit **143** is shown more clearly in FIG. **36**. The front cover sensing unit **143** is mounted on the printed circuit board **182**. For reference, FIG. **36** is a sectional view taken along a line C-C of FIG. **35**.

The front cover sensing unit **143** may detect a state change of the front cover part **220** through a change in magnetic field.

The connection part **290** connects the terminal coupling part **210** and the front cover part **220**. Accordingly, one end of the connection part **290** is couple with the terminal coupling part **210** and the other end is coupled with the front cover part **220**. The connection part **290** is formed of a flexible material. Accordingly, while the mobile terminal **100** is coupled with the terminal coupling part **210**, the rear of the front cover part **220** may be disposed at the position contacting the front of the mobile terminal **100** or may rotate about 180° and thus the front of the front cover part **220** may be disposed at the position contacting the rear of the terminal coupling part **210**.

Hereinafter, an interface provided by a mobile terminal and a terminal case is described with reference to FIGS. **37** and **38**.

The mobile terminal **100** has a first user interface mode and a second user interface mode. Additionally, the display unit **151** of the mobile terminal **100** includes a first display area **410** where an image is displayed in the first user interface

mode and a second display area **420** where an image is displayed in the second user interface mode.

The first display area **410** may be an area corresponding to the front incision part **221** of the front cover part **220** or a predetermined area in an area corresponding to the front incision part **221**, and the second display area **420** may be an entire active area of the display unit **151**. Accordingly, the first display area **410** may be a portion of the second display area **420**. Moreover, an area corresponding to the front incision part **221** means an area overlapping the front incision part **221** when the front cover part **220** covers the display unit **151** at the front of the mobile terminal **100**.

In the first user interface mode, the control unit **180** provides a first user interface in the first display area **410**.

The first user interface mode is an operating mode of the mobile terminal **100** providing a user interface through the front incision part **221** of the front cover part **220** when the front cover part **220** of the terminal case **200** is closed. In the first user interface mode, the mobile terminal **100** may receive a touch input through the first display area **410**. Accordingly, even when the front cover part **220** of the terminal case **200** is closed, a user may view a displayed image or perform a touch input. Additionally, the control unit **180** of the mobile terminal **100** may obtain a sound input through the microphone **122** in the first user interface mode.

Moreover, in the first user interface mode, the control unit **180** stops displaying an image in an area **420** other than the first display area **410** and limits a touch input. That is, when it is possible to turn on/off some pixels of the display unit **151**, the control unit **180** may turn off pixels in an area other than the first display area **410** in the first user interface mode. Or, when it is impossible to turn on/off some pixels of the display unit **151**, the control unit **180** may display the outer of the first display area **210** as block color.

Moreover, as entering the first user interface mode, the control unit may ignore a touch signal inputted through an area other than the first display area **410**.

The second user interface mode is an operating mode of the mobile terminal **100** providing a second user interface through an entire active area of the display unit **151** when the front cover part **220** of the terminal case **200** is opened or the mobile terminal **100** is separated from the terminal case **200**.

Switching between the first user interface mode and the second user interface mode may be performed based on the sensing information of the front cover sensing unit **143**.

That is, the control unit **180** receives detection information on the front cover sensing unit **143** and enters the first user interface mode if it is determined that the front case is closed. In this case, the first user interface is provided through the first display area **410**.

On the other hand, the control unit **180** receives detection information on the front cover sensing unit **143** and enters the second user interface mode if it is determined that the front case is opened. In this case, the second user interface is provided through the second display area **420**.

Accordingly, even when the front cover part **220** of the terminal case **10** is closed, a user may perform various operations, for example, receiving a call, playing music, or checking the weather.

Additionally, when an event that needs to be notified to a user occurs, for example, when a call or text messaging is incoming, since applications corresponding to events are executed in the first user interface mode, a user may check various events without opening the front cover part **220** of the terminal case **200**.

Moreover, when the second user interface mode switches into the first user interface mode, the control unit **180** may continuously operate the application executed in the second user interface mode. The control unit **180** may adjust the execution screen of the application to correspond to the first display area **410** if necessary, so that the application may be executed continuously in the first display area **410**. Or, even if the control unit **180** continuously executes the application executed in the second user interface mode, it may not display the application on the display unit **151** in the first user interface mode. Or, the control unit **180** may overlay the first user interface on the second user interface. At this point, the control unit **180** may receive a user input and on the basis of the received user input, may determine the transparency of the first user interface. The control unit **180** may display the second user interface through the first user interface by adjusting the transparency.

However, since the control unit **180** provides the first user interface in correspondence to the front incision part **221**, according to a specific embodiment of the present invention, the control unit **180** may limit a specific function of a specific application in the first user interface mode. Especially, when the front cover part **220** is closed and the front camera is unavailable, the control unit **180** may limit a video call related function. Or, since a touch area is limited in the first user interface mode, the control unit **180** may limit functions requiring a touch input of a relatively large area. An example of limiting a function by the control unit **180** may include the text writing and sending of a text application by a touch input, the phone number searching and favorite phone number sensing of a call application by a touch input, and the music searching of a music application by a touch input. However, unlike a touch input, the control unit may obtain a sound input without restriction in the first user interface mode. Accordingly, when such functions are executed based on a sound input, the control unit **180** may not limit such functions.

Additionally, the size or position of the first display area **410** may be changed by a user. FIG. **38** is a view when the size or position of the first display area **410** is changed. Accordingly, even if the size of position of the front incision part **221** is changed by replacing the terminal case **200**, the first display area **410** may be set to correspond to the new front incision part **221**.

A method of the control unit **180** to receive a user input so as to change the size or position of the first user interface includes a method of receiving a touch input for moving a graphic representing the first display area **410** displayed on the display unit **151** or changing the size. Moreover, the control unit **180** may set the position and size of the first display area **410** or the first user interface on the basis of a numeric input on the size and coordinates from a user.

Moreover, light sources providing light to the display unit **151** may be differently turned on or turned off in the first user interface mode and the second user interface mode.

Moreover, the size and position of the front incision part **221** of the front cover part **220** may vary according to a type and design of the terminal case **200**. Additionally, a color or pattern of the terminal case **200** may be changed diversely. Accordingly, the control unit **180** may change the feature of the first user interface. The feature of the first user interface includes at least one of the position, size, background color, and a background image of the first user interface.

Accordingly, the mobile terminal **100** may display the first user interface not being restricted from any kind of the terminal case **200**. That is, the mobile terminal **100** may operate being combined with various kinds of terminals cases **200** having different designs. Additionally, the control unit **180**

may change a background color or a background image of the first user interface, so that it may provide a sophisticated and aesthetic interface.

Additionally, the control unit **180** may receive a user input for changing the feature of the first user interface and on the basis of the received user input, may change the feature of the first user interface.

In order to change the size or position among the features of the first user interface, the control unit **180** may receive a touch input for moving a graphic representing the first display area **200** displayed on the display unit **151** or changing the size. Or, the control unit **180** may obtain a numeric input on the position and size of the first user interface directly from a user.

Or, the control unit **180** may recognize the identifier of the terminal case **200** and may change the feature of the first user interface on the basis of the identifier specifying the kind of the terminal case **200**. In more detail, the mobile terminal **100** includes a feature table for first user interface information and the control unit **180** may match the identifier of the terminal case **200** to the feature table. The feature table includes features of a plurality of user interfaces respectively corresponding to the identifiers of the terminal cases **200**. The control unit **180** may change the feature of the first user interface according to a matching result.

In a specific embodiment, the control unit **180** may specify a type of the terminal case **200** by recognizing the identifier of the terminal case **200** on the basis of a Near Field Communication (NFC) tag in the terminal case **200**. In more detail, when the terminal case **200** including an NFC tag is coupled with the mobile terminal **100**, the short range communication module **114** may receive the identifier of the terminal case **200** from the NFC tag. The control unit **180** may recognize the identifier of the terminal case **200** by receiving it from the short range communication module **114**.

Moreover, the control unit **180** may recognize the identifier of the terminal case **200** on the basis of QR code in the terminal case **200**. The QR code, as a matrix bar code representing information in a black and white plaid pattern, may contain 3-dimensional various information in advantage of a large capacity compared to an existing bar code containing limited information such as product price and name due to a limited capacity. The camera **121** may generate an image including QR code by capturing the QR code. The control unit **180** may extract the QR code from the generated image. The control unit **180** may recognize the identifier of the terminal case **200** on the basis of the extracted QR code.

Moreover, the control unit **180** may change the feature of the first user interface on the basis of a resistance value in the terminal case **200**. At this pint, the terminal case **200** may include a resistor. In more detail, the sensing unit **140** may detect a resistance value of a resistor in the terminal case **200**. In more detail, the sensing unit **140** may supply voltage to the resistor in the terminal case **200**. At this point, the sensing unit **140** may detect a resistance value of a resistor by using the magnitude of a current flowing in the resistor. In more detail, the mobile terminal **100** includes a feature table for first user interface information and the control unit **180** may change the feature of the first user interface by matching the detected resistance value to the feature table. The feature table includes features of a plurality of user interfaces respectively corresponding to the identifiers of the terminal cases **200**. The feature of the first user interface includes at least one of the position, size, background color, and a background image of the first user interface.

Moreover, the control unit **180** may determine one of the background color or background image of the first user interface on the basis of magnetic field value according to a magnetic material mounted at the terminal case **200**. At this pint, a magnetic material may be mounted at the terminal case **200**. The sensing unit **140** may include a plurality of hall sensors disposed at different positions to detect magnetic field. The control unit **180** may change the feature of the first user interface according to the magnitude of a magnetic filed detected by the plurality of hall sensors.

Moreover, the control unit **180** may change the feature of the first user interface on the basis of a color of the terminal case **200**. In more detail, the sensing unit **121** may generate an image including the color of the terminal case **200** by capturing it. The control unit **180** may digital-signal-process the generated image to extract the color of the terminal case **200**. The mobile terminal **100** includes a feature table for first user interface information and the control unit **180** may change the feature of the first user interface by matching the background color to the feature table. The feature table includes features of a plurality of user interfaces respectively corresponding to a plurality of colors. The feature of the first user interface includes at least one of the position, size, background color, and a background image of the first user interface.

FIG. **39** is a view when the control unit **180** of a mobile terminal selectively turns on/off a light source of a backlight unit of a display unit according to a user interface mode.

The backlight unit of the display unit **151** may include a plurality of light sources dividing and lightening a display area of the display unit **151**. The control unit **180** may turn on/off at least one of the light sources according to a current user interface mode.

That is, when a current user interface mode is the first user interface mode, the control unit **180** turns on at least one light source in an area corresponding to the first user interface among a plurality of light sources, and turns off at least one light source in the remaining area other than the area corresponding to the first user interface. When a current user interface mode is the second user interface mode, the control unit **180** turns on at least one light source in an area corresponding to the first user interface. Through this, the battery of the mobile terminal **100** may be saved.

As shown in FIG. **39**, the display area of the display unit **151** illuminated by a light source of a backlight unit of the display unit **151** is divided into two areas. In the first user interface mode, light sources lightening an area **430** including a first display area **410** are turned on and light sources lightening an area **450** other than the area **430** are turned off. According to a specific embodiment of the present invention, the number of light sources and a display area illuminated by a light source may vary.

Additionally, in order to save the battery of the mobile terminal **100**, the brightness of an area of the display unit **151** where the first user interface is displayed in the first user interface mode may be separately set different from the brightness of the display unit **151** in the second user interface mode by a user setting. That is, the brightness of the display unit **151** in the first user interface mode may be set darker than that in the second user interface. When the battery remaining of the mobile terminal **100** is insufficient, the control unit **180** may reduce the brightness of an area of the display unit **151** where the first user interface is displayed in the first user interface mode in order to save power.

The first user interface and an operation of the mobile terminal **100** through this are described in more detail below.

Hereinafter, an operating method of a mobile terminal according to a state change of the front cover part **220** of the

terminal case **200** will be described with reference to FIGS. **40** and **41** in accordance to the third embodiment of the present invention.

FIG. **40** is a flowchart illustrating operations of a mobile terminal when a state of the front cover part **220** of a terminal case is changed.

The front cover sensing unit **143** detects a state change of the front cover part **220** of the terminal case **200** in operation S**101**. A state of the front cover part **220** includes a state changing from an opened state into a closed state and a state changing from a closed state to an opened state.

The control unit **180** determines whether the current display unit **151** is turned on in operation S**103**. If a partial area of the display unit **151** is turned on, it is determined that the display unit **151** is turned on.

The control unit **180** determines a current user interface mode according a state of the front cover part **220** and whether the display unit **151** is turned on.

When the current display unit **151** is turned on and a state of the front cover part **220** changes from an opened state into a closed state, the control unit **180** determines a current user interface mode as a first user interface mode. That is, the control unit **180** executes an application through the first display area **410**. At this point, a basic application of the first user interface mode in execution may be changed by a user's selection.

For example, a clock application may be a basic application. Or, a basic application of the first user interface mode may be the last executed application in the first user interface mode. However, while a music player application **510** plays music, the control unit **180** may execute the music player application **510** when determining a user interface for user's convenience regardless of a basic application. The control unit **180** stands by while maintaining the first user interface mode for a predetermined time. The predetermined time for standing by may be changed by a user's setting. The predetermined time for standing by may be more than several sec and less than 1 min and may be 10 sec preferably. If there is no additional user input with the predetermined time for standing by, the control unit **180** turns off the display unit **151**. If the battery remaining of the mobile terminal **100** is insufficient, the control unit **180** may reduces the standing by time to save power.

When the current display unit **151** is turned off and a state of the front cover part **220** changes from an opened state into a closed state, the control unit **180** does not perform an additional operation.

When a state of the front cover part **220** changes from a closed state into an opened state regardless of whether the display unit **151** is turned on, the control unit **180** determines a current user interface mode as a second user interface mode. Since the front cover part **220** does not cover the display unit **151**, a user may use the front of the display unit **151**.

While the control unit **180** executes an application in the first user interface mode, if the first user interface mode changes into the second user interface mode, the control unit **180** may adjust a screen of the currently running application to the second user interface mode while continuously executing the currently running application.

FIG. **40** is a view when a display screen of a display unit where a camera application is executed is changed as a case cover is opened and closed.

As shown in the left of the drawing, a user interface displayed through an entire display unit is reduced to a size and position corresponding to a front incision part as the front cover part **220** is closed.

Accordingly, as described in the first embodiment, according to whether the lens cover **240** is opened or closed, an image displayed on the display unit **151** is displayed only through a first display area **410** when the front cover part **220** is closed and is displayed only through a second display area **420** when the front cover part **220** is opened.

Applications executed in the first user interface mode and operations of each application are described with reference to FIGS. **42** to **45**.

FIG. **42** is a view illustrating a lock screen in the first user interface mode and the second user interface mode.

The left of FIG. **42** is a typical lock screen requiring a pattern input in the second user interface mode. The right of FIG. **42** is a lock screen requiring a pattern input smaller than that in the second user interface mode. Since the first and second user interfaces have a difference in the size of a display area, each may set a different lock screen to fit for its size. In a specific embodiment, even when the lock screen of the second user interface mode uses a lock screen using a pattern input, a lock screen of the first user interface may use a lock screen using a password.

FIG. **43** illustrates another example of a user interface.

The memory **160** may store a plurality of applications executable in the first user interface mode. That is, a user may execute various applications in the first user interface mode. According to another embodiment of the present invention, a user may execute a music player application **510**, a clock application **520**, a weather forecast application **530**, and an image viewer application **540**. That is, a user may execute the music player application **510**, the clock application **520**, and the weather forecast application **530** without opening the front cover part **220** of the terminal case **200** in the first user interface mode. Accordingly, a user may save a time and operation necessary for executing an important application of a mobile terminal.

The control unit **180** may switch an application executed in the first user interface mode into another application. Such switching may be performed by a user input. At this point, a kind of user input includes a touch input, a button input, and a voice input. Especially, the touch input may include dragging in a first direction, flicking, and sliding. The first direction may be a horizontal direction of a mobile terminal. Especially, the button input may include a menu button input or a cancel button input.

Additionally, an application executed in the first user interface mode may include a plurality of pages. The control unit **180** may switch each page of an application by a user input. At this point, a kind of user input includes a touch input, a button input, and a voice input. Especially, the touch input may include dragging in a direction different from the first direction, flicking, and sliding. The direction different from the first direction may be a vertical direction of a mobile terminal. Especially, the button input may be a volume button input. The voice input may be an input having voice data different from a user input for switching an application.

The clock application **520** may include a plurality of pages. The clock application **520** in FIG. **43** may display a base city of a currently displayed time and a time for another city, or may include N pages having different graphic styles.

The weather forecast application **530** may include a plurality of pages. According to the embodiment of FIG. **13**, the weather forecast application **530** may display a currently displayed weather forecast and weather forecast for another city, or may include N pages having different graphic styles.

Notification operations of applications executed in the first user interface mode are described with reference to FIGS. **44** and **45**.

FIG. **44** is a flowchart illustrating operations of a mobile terminal when an event that needs to be notified to a user occurs with a closed front cover part of a mobile terminal case in the mobile terminal according to another embodiment of the present invention.

The control unit **180** recognizes that an event that needs to be notified to a user occurs in operation S**501**. The event that needs to be notified to a user is an event requiring a notification, that is, when some data are received by a user or which state the mobile terminal **100** is in needs to be notified. A specific example of the above event includes receiving a phone call, receiving a text message, or reaching a predetermined time set by an alarm application or a timer application.

The control unit **180** determines whether the current display unit **151** is turned on in operation S**503**.

If the current display unit **151** is not turned on, the control unit **180** turns on the display unit **151** in operation S**505**.

The control unit **180** determines a current user interface mode as the first user interface mode in operation S**507**.

The control unit **180** notifies a corresponding event to a user by executing an application corresponding to an event through the first user interface mode in operation S**509**. Since such events that need to be notified to a user are displayed through a first user interface, a user may confirm important information without opening the front cover part **220** of a mobile terminal. That is, a user may save a time and operation necessary for checking in formation on a mobile terminal.

FIG. **45** is a view illustrating an operation of a call application in a user interface according to another embodiment of the present invention.

When the mobile terminal **100** receives a call while the front cover part **220** of the terminal case **200** in the mobile terminal **100** is closed, the control unit **180** executes a call application through the first display area.

FIG. **45**(A) is a view when a typical call is incoming. A call application displays a name, a phone, number, and a picture, that is, sender's information. Additionally, a user may receive or reject the call through a first display area **410**. That is, a user may receive or reject the call without opening the front cover part **220** of the terminal case **200**. In more detail, the control unit **180** may obtain a swipe touch input through the first display area **410** and accordingly, may receive or reject the call. Or, the control unit **180** obtains a user's button input and accordingly, receives or rejects the call. At this point, the position of a button is not limited and especially, may be disposed at the rear of the mobile terminal **100**. Or, the control unit **180** obtains a user's voice input and accordingly, receives or rejects the call. When the front cover part **220** of the terminal case **200** includes a touch input available area, the control unit **180** may receive or reject the call by receiving a touch input through the touch input available area. If there is a privacy protection setting, the control unit **180** allows a call application to display sender's information only when obtaining an additional user input.

FIG. **45**(B) is a view when a user talks to the other party through a typical call. When a user closes the front cover part **220** of the mobile terminal **100** during a call, as described with reference to FIG. **45**(B), the control unit **180** switches a user interface mode into the first user interface mode. At this point, the call application displays the name, phone number, picture, and current call time of the other party on the call. Additionally, the call application displays a message that the front cover part **220** of the terminal case **200** needs to be opened to use several call options. If there is no user's touch input or button input for predetermined time, the call application turns off the entire display unit **151**.

FIG. **45**(C) is a view when multiple calls are incoming. The call application displays information on the multiple calls and a message that the front cover part **220** needs to be opened to use a multiple call option. In addition to the incoming multiple calls, when a video call is incoming, the call application displays information on the multiple calls and a message that the front cover part **220** needs to be opened to use a video call option in the first user display mode.

FIG. **45**(D) is a view when the front cover part **220** is opened during a call with the closed front cover part **220**. The control unit **180** may adjust the size of an application screen to fit for the first user interface as switching the second user interface mode into the first user interface mode. That is, the control unit **180** adjusts the screen size of the call application to the size of the entire display unit **151**.

Additionally, the control unit **180** may obtain a voice input in the first user interface mode and on the basis of the obtained voice input, may perform functions, for example, phone book search, the latest outgoing number sending, and phone book favorite sending. As described above, a voice input is not limited unlike a touch input in the first user interface mode. Accordingly, as the control unit **180** executes various functions of a call application on the basis of the obtained voice input, a user's convenience is improved.

When a text is received in the first user interface mode, it operates as follows. When the front cover part **220** of the terminal case **200** is closed and another application is not displayed in a first display mode, a text messaging application is executed in the first user interface mode. At this point, according to an embodiment of the present invention, the text messaging application may display the sender, content, date, and time of the received text message. The text messaging application may display some or all of contents on a text message or may not display contents on a text message and display only a fact that a text message is received. While another application is displayed in the first user interface mode, if a text message is received, the control unit **180** may display a text message reception through an icon in a screen of an application in execution or a pop-up window. At this point, the control unit **180** may obtain a user input and on the basis of the obtained user input, may execute various functions of the text messaging application. Especially, the user input may be a touch input or a voice input. In the first user interface mode, the control unit **180** obtains only a touch input through the front incision part **221** or a touch input through a partial area of the front cover part **220**. Accordingly, if the control unit **180** obtains a voice input instead of a touch input and executes a function of a text messaging application, a user's convenience may be improved.

An alarm application and a timer application's alarm operation in the first user interface mode are as follows.

As a user set time is reached, if an alarm application needs to notify it to a user, the alarm application is executed in the first user interface mode. A user may stop or snooze the alarm through the first user interface without opening the front cover part **220** of the terminal case **200**. That is, a user may stop or snooze the alarm by touching the first display area **410**. At this point, the user input may be a touch input or a voice input.

As a predetermined time elapses, if a timer application needs to notify it to a user, the time application is executed in the first user interface mode. A user may stop a timer through the first user interface without opening the front cover part **220** of the terminal case **200**. That is, a user may stop a timer by providing a touch input to the first user interface.

Operations of a mobile terminal relating to a first user interface during an external button input, for example, a power button and a volume button, are described with reference to FIGS. **46** and **47**.

FIG. **46** is a view illustrating a user interface displayed when a user long-presses a power button as a front cover part of a mobile terminal case coupled with the mobile terminal is closed according to another embodiment of the present invention.

The long press input is an input of continuously pressing a button for more than a predetermined time. In contrast, the short press input is an input of continuously pressing a button for less than a predetermined time.

When a front cover part of a mobile terminal case coupled with a mobile terminal is closed, if a user provides a short press input on a power button, an operation of the mobile terminal is as follows. The sensing unit **140** detects the short press input of the power button. When the short press input of the power button is detected, the control unit **180** determines whether a current display unit is turned on. If the current display unit **151** is turned on, the control unit **180** turns off the display unit **151**. If the current display unit **151** is not turned on, the control unit **180** turns on the display unit **151**. Since the front cover part **220** of the terminal case **200** is closed, the control unit **180** determines a current user interface mode as the first user interface mode. That is, an application is executed through the first user interface. At this point, a basic application of the first user interface in execution may be changed by a user's selection. Or, a basic application of the first user interface may be the last executed application in the first user interface mode. According to an embodiment of the present invention, the clock application **500** may be the basic application. However, while a music player application **510** plays music, the control unit **180** may execute the music player application **510** when determining a user interface in order for user's convenient use regardless of a basic application.

When the front cover part **200** of the mobile terminal **100** is closed and a user provides a long press input on a power button, the control unit **180** executes a power application through the first user interface. At this point, the running power application provides power off, power off and restart, and plane mode switching functions. A user may control the power of the mobile terminal **100** by selecting one of the above functions through a touch input on the first user interface **200**. Accordingly, a user may turn off the power of the mobile terminal **100** easily or may switch a mode of the mobile terminal **100** into a plane mode without opening the front cover part **220** of the terminal case **200**.

FIG. **47** is a view illustrating a user interface displayed when a user provides a volume button input as a front cover part of a mobile terminal case is closed according to another embodiment of the present invention.

FIG. **47**(A) illustrates a first user interface as a user presses a volume key when the front cover part **220** of the terminal case **200** is closed during a call. The control unit **180** adjusts a call volume according to the volume key input of a user and displays its numerical value on a first display area through a first user interface.

FIG. **47**(B) illustrates a first user interface as a user presses a volume key when the front cover part **220** of the terminal case **200** is closed and the music player application **510** plays music. The control unit **180** adjusts a music playback volume according to the volume key input of a user and displays its numerical value on a first display area through a first user interface.

FIG. **47**(C) illustrates a second user interface as a user presses a volume key when the front cover part **220** of the terminal case **200** is closed and the music player application **510** plays music. The control unit **180** may adjust the size of an application screen to fit for the first user interface as switching the second user interface mode into the first user interface mode. That is, the control unit **180** adjusts the screen size of the music player application **510** to the size of the entire display unit **151**.

Additionally, the control unit **180** may obtain a user's voice input and on the basis of the obtained voice input, may execute a music search function in addition to next track playback, playback, and pause.

Various embodiments described herein may be realized in a computer or device similar thereto readable recording medium by using software, hardware, or a combination thereof.

Moreover, the terminal coupling part **210** in the terminal case **200** may have forms as shown in FIGS. **48** to **50**.

Referring to FIG. **48**, the terminal case **200** includes a terminal coupling part **210** allowing the mobile terminal **100** to be detachable and a front cover part **220** foldably coupled with the terminal coupling part **210** to cover the front of the mobile terminal **100**. Additionally, the terminal case **200** further comprises a connection part **290** connecting the terminal coupling part **210** and the front cover part **220**.

The terminal coupling part **210** may have a band-shaped member extending in a horizontal direction. The terminal coupling part **210** has a form in which a central part extends flat and bends toward the front around the left and right end parts and protrudes. The terminal coupling part **210** may be formed of an elastically deformable material, for example, metal. The distance between the left and right end parts of the terminal coupling part **210** is formed to be narrower than the horizontal width of the mobile terminal **100**. Accordingly, when the mobile terminal **100** is coupled, the left and right end parts are elastically deformed and opened. After the mobile terminal is coupled, the left and right end parts of the mobile terminal **100** are pressed inwardly by elastic restoring force. Therefore, a coupling state between the mobile terminal **100** and the terminal coupling part **210** may be maintained.

Since a configuration and function of the front cover part **220** including the front incision part **221** and the connection part **290** are identical to those in the embodiment of FIG. **1**, their overlapping descriptions are omitted.

FIG. **49** is a perspective view illustrating the terminal case **200** according to another embodiment of the present invention. FIG. **50** is a perspective view when a stylus pen **10** and a mobile terminal **100** are coupled with the mobile terminal case **200** of FIG. **49**.

Referring to FIGS. **49** and **50**, the terminal case **200** includes a terminal coupling part **210** allowing the mobile terminal **100** to be detachable and a front cover part **220** foldably coupled with the terminal coupling part **210** to cover the front of the mobile terminal **100**. Additionally, the terminal case **200** further comprises a connection part **290** connecting the terminal coupling part **210** and the front cover part **220**.

As shown in FIGS. **49** and **50**, since a configuration and function of the terminal coupling part **210** and the front cover part **220** are identical to those in the embodiment of FIG. **48**, their overlapping descriptions are omitted. Only the connection part **290** that is different from FIG. **48** is described.

Referring to FIG. **49**, the connection part **290** connects the terminal coupling part **210** and the front cover part **220**. Accordingly, one end of the connection part **290** is couple

with the terminal coupling part **210** and the other end is coupled with the front cover part **220**. The connection part **290** is formed of a flexible material. The forward-backward direction of the connection part **290** is formed to be longer than the forward-backward direction width of the coupled mobile terminal **100**. Accordingly, when the front cover part **220** covers the front of the mobile terminal **100**, the connection part **290** may bend to have a semicircular or elliptical cross-section. Then, the bent inner space forms a stylus pen receiving part. Referring to FIG. **50**, the stylus pen **10** is coupled with the inner space formed by bending the connection part **290**.

Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

What is claimed is:

1. A mobile terminal assembly comprising:
a terminal case; and
a mobile terminal detachably coupled to the terminal case,
wherein the terminal case comprises:
a terminal coupling part covering rear surface of the mobile terminal; and
a front covering part covering a front surface of the mobile terminal and including a front incision part,
wherein the mobile terminal comprises:
a camera module for capturing images;
a display unit for displaying images transmitted from the camera module, wherein the front covering part is configured to selectively cover the display unit, wherein the display unit is configured to display a first user interface displaying information which is recognizable through the front incision part when the front covering part is oriented in a closed position, and wherein the display unit is further configured to display a second user interface displaying information which is recognizable through an entire area of the display unit when the covering part is oriented in an opened position;
a memory storing a camera application configured to control the camera module;
and
a control unit configured to control the display unit and the camera application,
wherein the display unit includes:
a first display area corresponding to the front incision part when the front covering part is oriented in the closed position; and
a second display area corresponding to the entire area thereof,
wherein, when the front covering part is oriented in the closed position, the camera application is configured to executed through the first user interface, such that an image captured by the camera module is displayed only through the first display area.

2. The mobile terminal assembly of claim **1**, wherein, when the camera application is executed when the front covering part is oriented in the closed position, and wherein a capture mode interface is displayed through the front incision part.

3. The mobile terminal assembly of claim **2**, wherein the capturing of the image by the camera module is initiated by a touch input to the capture mode interface.

4. The mobile terminal assembly of claim **3**, wherein the front incision part is defined as an opening portion which is formed by cutting a portion of the front covering part,
and wherein the capture mode interface is displayed on the display area corresponding to the front incision part.

5. The mobile terminal assembly of claim **2**, wherein, when the front covering part is moved to the opened position, the capture mode interface is configured to be displayed in the entire area of the display unit.

6. The mobile terminal assembly of claim **1**, wherein an image display and a touch input are restricted through an area other than an area corresponding to the first user interface when the first user interface is displayed.

7. The mobile terminal assembly of claim **6**, wherein pixels in an area other than the first display area are turned off when the first user interface is displayed.

8. The mobile terminal assembly of claim **1** further comprising;
a front cover sensing unit sensing whether the front covering part is opened or closed and controlling whether the first user interface or the second user interface is displayed.

9. The mobile terminal assembly of claim **1**, wherein a change of size or position of the first display area varies based on a change of size or position of the front incision part.

10. The mobile terminal assembly of claim **9**, wherein the change of size or position of the first display area is initiated by receiving a touch input signal for a movement or a size change of the graphics defining the first display area.

11. A mobile terminal comprising:
a camera;
a display unit; and
a memory storing a camera application configured to control the camera; and
a control unit configured to control the display unit and the camera application,
wherein the mobile terminal is configured to detachably couple with a terminal case comprising a front covering part covering and a front incision part,
wherein the front covering part is configured to selectively cover the display unit,
wherein the display unit is configured to display a first user interface viewable through the front incision part when the front covering part is in a closed position, and further configured to display a second user interface viewable through an entire area of the display unit when the front covering part is in an opened position, the display unit including a first display area corresponding to the front incision part when the front covering part is in the closed position and a second display area corresponding to the entire area thereof, and
wherein, the camera application is executable through the first user interface when the front covering part is in the closed position, such that an image captured by the camera is displayed through the first display area.

12. The mobile terminal of claim **11**, wherein the camera application is executable when a capture mode interface is displayed through the front incision part.

13. The mobile terminal of claim **12**, wherein the capturing of the image by the camera is initiated by a touch input to the capture mode interface.

14. The mobile terminal of claim **12**, wherein the capture mode interface is displayed over the entire area of the display unit when the front covering part is in the opened position.

15. The mobile terminal of claim **11** further comprising:

a front cover sensing unit configured to sense whether the front covering part is in the opened position or the closed position, and generating a signal that controls whether the first user interface or the second user interface is displayed.

* * * * *